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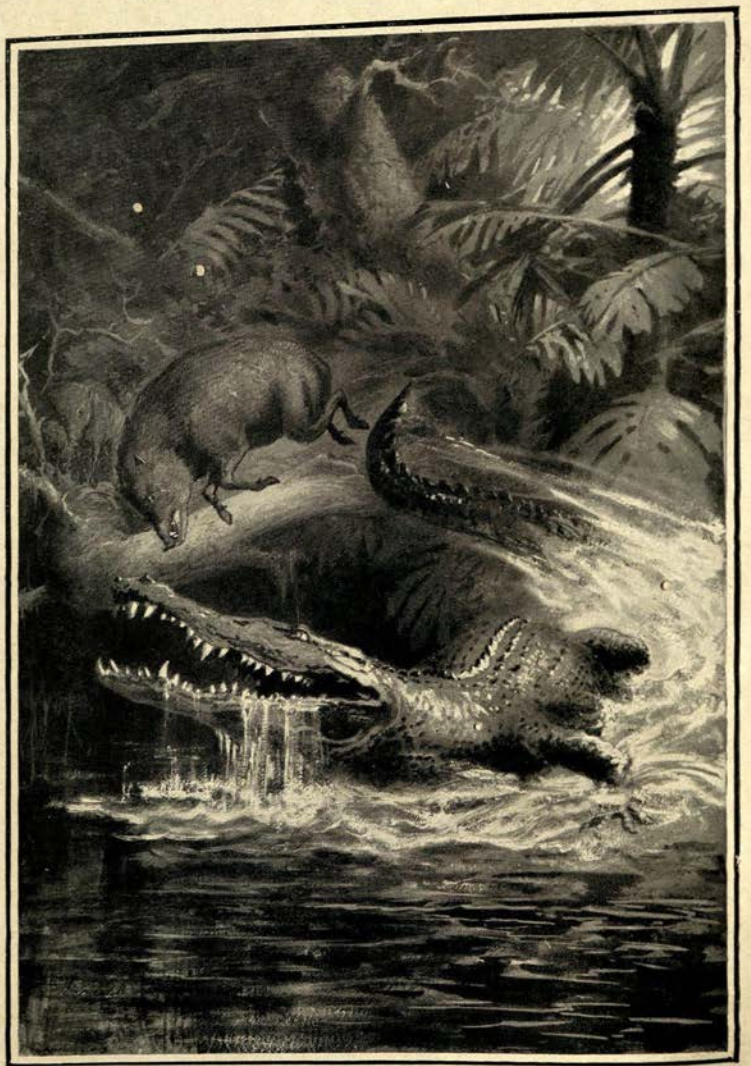
# THE ROMANCE OF THE ANIMAL WORLD



AN UNEXPECTED MEAL.

The peccary stood on the alligator's tail, mistaking it for a tree trunk. In a moment the alligator stretched its tail round like a bow almost to its side; suddenly it let go, and whilst the peccary thus shot up was still in mid-air, it swung its terrible tail again, and knocked its now insensible prey almost into its own jaws.

[*Frontispiece*—see p. 216.

# THE ROMANCE OF THE ANIMAL WORLD

INTERESTING DESCRIPTIONS OF THE STRANGE & CURIOUS IN NATURAL HISTORY

BY

EDMUND SELOUS

AUTHOR OF

"THE ROMANCE OF THE INSECT WORLD," "BIRD WATCHING," &c. &c.

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WITH SIXTEEN ILLUSTRATIONS BY LANCELOT SPEED & S. T. DADD

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# THE ROMANCE OF THE ANIMAL WORLD

## CHAPTER I

A MICROSCOPIC COMBAT—A SNAIL'S FRIENDSHIP—HERMIT-CRAB AND SEA-ANEMONE IN PARTNERSHIP—A CRAB IN AMBUSH—CRABS THAT EAT COCOANUTS.

BEFORE there can be any romance—as I understand the word—in animal life, there must be some degree of intelligence in the romance-making animals. The question, therefore, is, at what stage in the ascending scale any conscious exertion of brain-power—any evidence of what we call a mind—begins to show itself. I say this because I have to begin somewhere, and in my selection of subject-matter to illustrate the title of this book, I had intended to pursue a plan similar in principle to that resolved on by Koko, in Mr. Gilbert's *Mikado*, who, with a view to becoming perfect as an executioner, was going "to begin with a guinea-pig and work his way through the animal kingdom, till he came to a second trombone." Of course *I* must begin much lower down than a guinea-pig, and the nearest approach I can hope to make to a second

trombone will be a gorilla—but the principle is the same. However, on further consideration, I think that this scheme, if rigidly followed, may prove too exacting, and also give an appearance of scientific pretension to this humble little work, which it is entirely guiltless of. I have decided, therefore, to soften and modify it by the employment, when occasion offers, of another and somewhat opposed principle, that, namely, of letting one thing link itself to another as it does in ordinary conversation, either through suggestion or association, quite irrespective of whether there is any or no natural—that is to say, systematic—connection between the two. For instance, should alligators be the theme, and should they, after lying like logs on the water, and so forth, proceed, in the dramatic development of their character, to seize and devour some unsuspecting mammal, I shall use the incident as a convenient opportunity for treating of that mammal—should there be anything to say about it—without waiting for its proper turn to be treated of to arrive, as upon the first-stated principle I should have to do. But where opportunities of this sort do not present themselves—if birds have only to do with birds, insects with insects, and so forth—then I shall be systematic, and so go on, letting the one method balance the other. A third principle—that, namely, of paying no attention to either of the other two—will also occasionally be acted upon, and if, as a result of the three, no principle at all should be discernible by the reader, I would ask him to look upon that as a merit, since "Summa ars est celare artem." And now, having ex-

plained my system, which I think is an easy and flexible one, I will proceed to put it into practice in the best way I can.

The lowest of all animals are the *protozoa*, yet even here, as it appears to me, we begin to see the dawnings of that intelligence, without which that kind of interest which the life and acts of any creature should possess, in order to make it the subject for a work like this, can hardly be said to exist. The *infusoria* stand at the very bottom even of the protozoa. Most of them are so small as to be invisible, except through the microscope, and they are not supposed ever to think. Yet a creature belonging to this humble group, having a cup-shaped body, with a grasping arm or tail to it, has been seen to attach itself, with this, to the cup of another individual of the same species, considerably larger than itself, and cling there with a pertinacity very suggestive of a firm intent. Upon this the larger one became, to all appearance, very excited, and, moving about in the water—for these creatures are aquatic—till it came to some weed, fastened with its one limb on a piece of this, and proceeded to jerk itself backwards and forwards, with great suddenness and vigour, and with the evident design, as it seemed, of ridding itself of the intruder. The latter, however, held on like grim death, and this hard-pitched battle, which had all the appearance of being intelligently directed, went on between these two microscopic and simply formed creatures, for quite a long time. At length the smaller of the two was jerked off, upon which it made a second attempt to establish itself

as before, but was defeated by the efforts of its more powerful adversary. The witness of this interesting scene tells us it was very difficult to believe that the two lowly organisms engaged in it, though consisting but of a single cell, without a head and with no trace of a nervous system, properly so called, were not sentient beings, conscious of what they were doing, and of why they were doing it.

Coming to the earthworms, which stand higher than the protozoa, though still very lowly, there seems little doubt that they are capable of forming and carrying out an intelligent purpose, since, when they pull leaves into their holes, they always catch hold of them by the proper part, so that they go down easily, and this they do even with the leaves of foreign trees, of which they can have had no previous experience. And if worms have experience, snails have both that and something better, or, at any rate, still more interesting to discover in a creature of this kind. "They appear," says Darwin, "susceptible of some degree of permanent attachment. An accurate observer—Mr. Lonsdale—informs me that he placed a pair of land-snails, one of which was weakly, in a small and ill-provided garden. After a short time the strong and healthy individual disappeared, and was traced, by its track of slime, over a wall and into an adjoining well-stocked garden. Mr. Lonsdale concluded that it had deserted its sickly mate; but after an absence of twenty-four hours it returned, and, apparently, communicated the result of its successful exploration, for both then started along the same track, and disappeared over the wall."

Both snails and worms, however, stand higher in the scale than do the sea-anemones, amongst which latter creatures—those flowers of ocean, rivalling with their pillared stalks and many-coloured living petals the proudest ones on earth—we yet find an instance of what is called commensalism—the living together, that is to say, in friendly community of two separate and often widely sundered species, each thereby obtaining some benefit for itself. The other party to the arrangement is in this instance a crab—the hermit-crab—that curious anchorite which by living and moving about in the disused shell of another creature escapes the many dangers which would otherwise threaten its soft and palatable body. Indeed, the association may almost be said to be between three, rather than two, different species, each of them belonging to a separate and well-marked division of the animal kingdom—viz. to the mollusca, the crustacea, and the cœlentera respectively. As, however, the mollusc is represented by its house only, and not by itself—though, indeed, its house is structurally a part of it—it will be safest to consider the alliance as a dual rather than as a triple one. That the anemone establishes itself on the shell, not by mere chance, as might sometimes happen, did the crab allow of it, may be demonstrated in a very delightful way; for if, when it is attached to a stone, a hermit-crab should be placed in its vicinity, it will, after a time, abandon its post, and gliding, like a snail, to the hospitable portals of its friend's domain, proceed to attach itself there, much to the satisfaction of the latter. For that the crab's participation is of an

active kind, that he does not merely not mind the anemone, and that the latter has more than his sanction, is, likewise, a thing that can be proved. This discovery was first made in 1859 by Mr. Gosse, the naturalist, for up to that time it had always been imagined that the crab, at any rate, was indifferent. Mr. Gosse, however, by the simple expedient of detaching the anemone from the shell, demonstrated that this was not the case, for on each occasion that he did so the hermit-crab picked it up again in its two claws, and pressing it against its shell, held it there for about ten minutes, at the end of which time it was sticking fast, as before. The crab, therefore, must derive some advantage from the presence of the anemone in return for the protection which he perhaps affords the latter against certain enemies. Or possibly the constant change of locality, with its increased chances of procuring food, is the real or the principal benefit conferred. But how does the crab benefit? This, at first sight, is not quite so easy to see. The explanation usually given is that it is "masked" or concealed by the sea-anemone, which is by no means small in comparison with the size of the shell, but often almost and completely covers it, forming a sort of cloak round it at its base, and towering like a pillar above it, so that of the two it is by far the more conspicuous object, especially when the crab is withdrawn, or partly withdrawn, into its shell. Nor is it always one anemone only that is affixed to the shell; there may be as many as two or three, or even more, and in some cases not only the shell, but the crab's own claws may be thus utilised. Certainly, therefore, if concealment is a gain to

the crab, it obtains this advantage by the arrangement. If, too, it has any special enemies of its own—as it is very probable that it has—the stinging cells of its allies would be likely either to incapacitate them or keep them at a distance. Of one thing, at least, we may be certain, that some advantage is obtained—and, no doubt, it is a substantial one—by each of the individuals in this strange copartnership—for throughout nature, in associations of the kind, the principle expressed by the homely Scotch saying of "giff, gaff"—Anglicè, "nothing for nothing"—obtains. Apparent instances may indeed be found of one species doing something for the benefit of another, since the very nature of these arrangements is such as often to give them this appearance. But such instances are apparent only. Whatever it looks like, and whatever either or any of the parties concerned may do, they always do it for their own, and not for one another's benefit.

Supposing that concealment is the principal advantage accruing to the hermit-crab from its relations with the sea-anemone, it seems likely that this is more for the sake of securing prey than of avoiding enemies—though, indeed, both objects seem fairly attained by the shell. Another crab—the Hyas of Otaheite—arrives at similar results by means which are somewhat similar, but which, in this case, constitute a ruse which is all the creature's own. It deliberately loads on to its back a cargo of seaweed mingled with the sand and débris of the coral, amongst which it lives, and having done so, remains motionless, awaiting the advent of anything that may serve as a meal. The tips of the ready claws lie just within the weedy

thatch, whilst the eyes at the ends of their stalks are raised above it, so as to obtain a full view. They are, however, indiscernible, except in a fatally close proximity. Time passes, the sun shines brightly down through waters clear as the clearest crystal and bluer than the bluest sky. Fishes, rainbow-hued and flashing, sometimes, with the iridescent sparkles of the humming-bird—the jewels of the tropic seas—pass and repass often quite near to the unseen peril, but except by the motion of their own bodies, or the throb of the waves, the weeds which conceal it remain unstirred. Nothing happens—yet: the eyes observe, the claws may perhaps itch, but their owner moves not. Such beings are not for him. They are beyond his sphere, too bright, too beautiful, above all, too quick. Medusæ, too, of substance translucent as the waters they move in, and washed with the colours of the sea itself, go by, sometimes in flocks, alternately expanding and contracting their smooth, bell-like bodies, whilst threads and filaments of varied form, and delicacy more exquisite than that of the finest lace, stream in beauty behind them. Sea-horses swim vertically like little mermaids, twining their tails together, or around the long fronds of many-tinted seaweeds, whilst strange and varied forms of mollusc and crustacean move upon the shell-strewn sand, or amidst the bright mazes of the coral—but still our crab makes no sign. At length a small creature of the shrimp or prawn kind—a crustacean like itself, and more active it would seem, for it swims, though backwards and in a curious jerky way—approaches the little heap; the crab's eyes glisten—they would, at least, were they capable of

doing so. Alternately shooting up and sinking down again, the unsuspecting creature continues to play about in the close neighbourhood of that deadly ambuscade, and at length, in one of the latter movements, comes well within reach. It is almost on the bottom, its tail stirs the weeds and is about to bend again, when with a rush the lurking enemy is upon it, seizes it between its fatal claws, and retiring backwards amidst the shelter which the violence of its sudden movement has partially removed, proceeds to devour it at its leisure. Such is the stratagem, and such the sure, if somewhat slow, result. All sorts of creatures are thus secured by the crab, including, perhaps, on special occasions, a small and less wary fish or so.

What makes the thing still more curious and interesting—from the standpoint of the evolutionary naturalist—is that the back of the clever strategist is covered all over with a crop of stiff, wiry bristles, which, curving inwards, maintain a firm hold of the weeds that lie upon them, and prevent their slipping off. No doubt these bristles have become more and more developed as the crab has become more and more in love with the ruse, to the success of which they now largely contribute but which came first, the ruse or the bristles, that no one can say. On the one hand, the bristles, whilst yet small and but slightly curved, might sometimes, catching amongst and holding fragments of seaweed, etc., have suggested to the crab the use to which these might be put; but, on the other, as many creatures hide themselves in order to dart out on their prey, and as a good way of doing so in the case of a flat-backed creature would be by placing things on

its back, the crab may possibly have thought of this without any structural facility to suggest the idea.

Both these crabs that we have been considering exhibit their intelligence and live their lives in the sea, and it is with salt water and the rocky pools of the sea-shore that crabs, generally, are inseparably associated in our minds. Nevertheless there are land crabs, and even crabs that eat cocoanuts. Whether these latter are also in the habit of climbing the lofty palms on which the cocoanuts grow, throwing them down and then ascending again with them, in order to break them by repeating the process, having previously freed them from their huge husky envelope, does not seem to be quite certain, but such is the account explicitly given by the natives of the Samoan Islands. "I inquired of them," says Mr. T. H. Hood, in his *Notes of a Cruise in H.M.S. "Fawn" in the Western Pacific*, "about the habits of the Ou-ou, or great cocoanut-eating crab, common here, and found the reports previously received from the natives corroborated. It ascends the cocoa trees, and, having thrown the nuts down, husks them on the ground; this operation performed, it again ascends with the nuts, which it throws down, generally breaking them at the first attempt, but, if not successful, repeating it till the object is attained." This account, Mr. Hood goes on to say, was confirmed by every native subsequently spoken to on the subject. It is difficult to see how the natives should have been mistaken in regard to such a noticeable and very remarkable habit, and on the other hand, if they were inventing, why should they have all

invented in one and the same way? In the new edition of Wood's *Homes without Hands* this account of Mr. Hood is still quoted without any qualifying statement in the form of a footnote. On the other hand, Darwin, when he visited the Keeling Islands, was told by Mr. Liesk, an English resident on one of them, that the crabs fed upon such nuts only as happened to fall from the trees. The Keeling and Samoan Islands are, however, some 5,000 miles apart, and it is at least possible that the crabs of each, though of the same species, may have learnt a different way of getting at the inside of the cocoanut, especially as elsewhere they seem to practise yet a third method.

To begin with Darwin's account. Mr. Liesk, speaking as an eye-witness, told him that the crab first shredded off the husk, fibre by fibre, beginning always at that part under which the three eyeholes of the nut lay. It then, he said, hammered with its claws, which are heavy and powerful, on one of the eyeholes and, having made an opening, turned round and inserted its thin posterior legs, which are also armed with small pincers, into it, and thus extracted the kernel. This is a plain statement, and in it we see the philosophy of the small and weak pair of claws which are as useful in the last and most satisfactory part of the process as are the larger ones in the pioneer work preceding it. Just as plain, however, is the following statement, which was made by two South Sea missionaries (Mr. Tyerman and Mr. Bennett) at about the same time. They say "These animals live under the cocoanut trees, and subsist upon the fruit which they find on the ground.

With their powerful front claws they tear off the fibrous husk; afterwards inserting one of the sharp points of the same into a hole at the end of the nut, they beat it with violence against a stone until it cracks; the shell is then easily pulled to pieces, and the precious food within devoured at leisure." Here, then, is quite a different way of getting at the contents of the cocoanut, but the same informants go on to say that "sometimes by widening the hole with one of their round gimlet claws, or enlarging the breach with their forceps, they effect sufficient entrance to enable them to scoop out the kernel without the trouble of breaking the unwieldy nut." This, perhaps, may mean the same as what Mr. Liesk tells us, but nothing is said about the crab's turning round. It is not very clear from the account of the two missionaries whether they speak as eye-witnesses or not. Mr. Liesk does, but I should not myself think that his observations had been very exhaustive, and as the *Voyage of the Beagle*, in which they are referred to, was published nearly sixty years ago, it seems to me a pity if the habits of the cocoanut-eating crab have not been more carefully studied since then. I think myself that a crab which lives on cocoanuts, and may possibly climb the trees on which they grow, is worth taking some trouble about. This, however, is not all that the *Birgus latro*—for that is his scientific name—does. Not only does he live upon land, but he makes a deep burrow in the ground to dwell in, and with the shredded fibres of the cocoanut husk, which he has torn up, he makes a thick soft bed at the bottom of it to lie on. One would think with all this that he

had said good-bye to the sea for good and all, and would never want to go back to it. But this is not the case. Like other crabs, these strange ones breathe through branchiæ or gills, as a fish does, and in order for them to do so these must be kept moist. The peculiarity of all land-crabs is that their gills remain moist for a long time, but at the end of this time, when they are beginning to get dry, they have to moisten them again. Every night, therefore, the cocoanut crab pays a visit to the sea, and has a cool, refreshing bathe in it. For a little while he is a marine creature again, as his ancestors were before him, but when he has moistened his gills, he goes back to his palm-trees and cocoanuts.

This great strange crab grows to two feet in length, is stout in proportion, and has a fantastic appearance, which it is difficult to describe. It walks very high on two long stout pairs of legs, whilst a pair or two of little ones behind them are too short to touch the ground, and so dangle in the air. Its claws are enormous, its thorax very peculiar, its antennæ are like those of a lobster, and its body behind more like a hornet's than a crab's—at least in a picture. What it really resembles is a hermit-crab, to which it is closely related; only to see the resemblance one must take the hermit-crab out of its borrowed shell.

## CHAPTER II

NATURE'S PARASITES—PUSS-MOTH CATERPILLAR AND ICHNEUMON-FLY—CATERPILLAR DEFENCES—WASPS AND THEIR VICTIMS—A SPIDER CAUGHT—ANTS THAT ARE OGRES—OSPREY AND EAGLE—GULLS AND SKUAS—PEEWIT AND BLACK-HEADED GULL.

IN the sea-anemone affixing itself to the shell of the hermit-crab, who becomes its friendly and interested landlord, we have seen one of the more pleasing instances of association between two or more different species of animals. There are many others, such as that between the shark and the pilot-fish, the honey-guide and the ratel, the rhinoceros and its little bird, etc., etc., which we can dwell upon with equal pleasure. Some, however —and, unfortunately, they are much more numerous—are of a darker character, repelling us almost as much by the picture which they present of nature's unbending cruelty as they arouse our admiration by their wonderful ingenuity and adaptation of means to ends. The most salient examples of this kind of living together—partnership we can hardly call it—are to be found, perhaps, in the insect world. Parasitism is the proper word for it, and the most salient, or at least the most repulsive, examples are furnished perhaps by the hymenoptera—that genus of insects in which the bees, wasps, and ants

are included. Thus almost all caterpillars—perhaps all —are victimised by some species of ichneumon-fly—a wasp-like creature that seeks it out, pierces its soft body with a long ovipositor, with which it is provided for the purpose, and lays a number of eggs inside it. Having done this, it goes away, and the caterpillar goes on feeding. It is, however, doomed, and destined never to enter into the moth or butterfly state of existence. In due time the eggs are hatched by the warmth of its own body, and on this body to which they are so highly indebted, the young ichneumons, now in their own caterpillar state, begin with unconscious ingratitude to prey. They feast upon it day and night, but the creature, ordained by the iron laws of nature to suffer in this way, is long-lived, and though sickening from day to day, has often sufficient strength to become full-fed, and make its cocoon, and pass into the chrysalis, or pupal, state. How long it lives after that it is difficult to say. Probably some vitality remains as long, or almost as long, as any part of itself does. All that we know is that after a longer or shorter interval a score or so of ugly, evil-looking ichneumon-flies issue from the dry shell of the chrysalis, instead of the innocent and radiant creature that would otherwise have done so.

It is curious—gratifying, too, if one allows oneself to give way to a natural, though unreasonable feeling—to learn that some of these very ichneumons themselves become, in a similar manner, the victims of others of their own species. Thus from two corpses, on the slowly dying bodies of both of which it has directly, or indirectly, fed,

the third life in death emerges, like some ghoul from a double tomb. Could the caterpillar know that the being which so remorselessly preyed upon its tissues and juices had a similar parasite within its own body, doing it to death in the same horrid way, how relieved and almost happy it might feel! But Nature, though she often brings in her revenges, seldom grants to her suffering children the proverbial sweetness of revenge. Caterpillars, however, do not always submit to the machinations of the ichneumon-fly without a struggle, and in some cases they may be successful—how often it is not easy to say—in guarding themselves against their attacks. The puss-moth, for instance, which is especially liable to them, is furnished, no doubt for that very reason, with a special weapon for its defence. The end of its body is forked, and each fork is prolonged into a sort of tail, from which a red filament can be extruded and waved about at the will of the creature. In this way, and by its violent contortions, it may sometimes succeed in whipping off, as it were, the ichneumon that is attacking it, but it has another and more efficacious means of defending itself. An aperture in the skin behind the head communicates with a gland containing a clear fluid, forty per cent. of which is formic acid, and the rest water. This the caterpillar can eject with great force, and so pungent is it that a few drops falling on an unwary ichneumon-fly are sufficient to incapacitate, if not actually to kill it. Lizards, indeed, and monkeys, as has been experimentally ascertained, are affected by this powerful irritant, nor, as far as we know, is there any other animal secretion which

contains so large a proportion of strong acid. It is probable that the caterpillar of the puss-moth is not the only one which has this power of spurting a noxious fluid over its enemies, whilst many are protected in other ways: some by their hairiness, others by being coloured like the leaves they eat, or resembling, when at rest, a twig of the plant on which they sit immovable. By these latter means they certainly avoid being eaten by birds, and there seems no reason why they should not sometimes deceive the ichneumon-fly also. But in spite of all defences, whether consciously or unconsciously brought into play, a large proportion of most caterpillars yield to destiny, and are slowly eaten alive by the special parasite which Nature has provided for them.

Still worse, perhaps, though very similar, is the fate which various insects—caterpillars, grasshoppers, etc.—as well as spiders, experience at the hands of several species of wasps. These wasps are not social, like the ones we are familiar with, and make no nest other than a cell in which to place their eggs, together with the nourishment which the young, when hatched, will require. This nourishment is the creatures aforesaid. In the best-known instance the female wasp first makes a long tunnel in the earth, with three or four separate chambers or cells at the end of it, in which she deposits her eggs. She then seizes an insect, which, if it is a grasshopper, or something equally active, struggles violently to escape, and being often as large as, or larger, than the wasp herself, the contest may be a long one. Invariably, however, the wasp—or *sphex*, to give her her

generic name—is victorious. She could, indeed, sting at once, if she were so minded, but this she does not do. She reserves her fire, so to speak, till, after more or less violent exertion, she has succeeded in throwing her victim on its back. Then she stings it in two particular spots, the throat, namely, and between the thorax and abdomen. Instantly the struggles of the wretched creature cease: a ganglion, or nerve centre, has, with each sting, been pierced—it is paralysed, but not by any means dead. To kill it, indeed, is far from the intention of the *sphex* herself. A kind and thoughtful mother, she does not allow the meat which she provides for her offspring to go bad. It will last, as she has managed it, for the whole time that it is wanted. All now is quite satisfactory. She can be grateful for mercies vouchsafed. She rests for a little, then seizing the helpless, living food by a leg or a wing, she drags it—for it is usually too heavy for her to fly with—to the mouth of her nursery larder. Here she leaves it for a little, while she enters to see that all is well. Re-emerging, she seizes it again, drags it down the tunnel, deposits it in one of the chambers, plasters it up, and leaves it for a while. In due time she returns with, and inters, another paralytic, and, having thus successively filled all the four chambers, she closes the mouth of the tunnel and flies merrily away—doubtless

"With the gratifying feeling that her duty has been done."

Of course, after a certain number of days, the eggs are hatched, each young *sphex* caterpillar immediately falls to, and the grasshoppers that have been previously buried

alive are now eaten alive—two kinds of deaths which are equally unpleasant, and each of which lasts a long time. However, they are paralysed—insensible, we may hope, therefore, to such pain as insects feel. Whether the paralysis is mental as well as corporeal it is impossible to say, but it may, in any case, be doubted whether grasshoppers can suffer through the mind. Assuming that they cannot, the inability, though it would involve another of an opposite nature, must yet here be considered advantageous, since that sort of pleasure which arises out of a just sense of the beautiful contrivances and adaptations of nature, must always, we may suppose, be beyond the capacity of an insect; and even were it not, it is the *sphex* in this case whose mind would, in all probability, be most open to such reflections.

The habits of the *sphex* have been studied in Europe by "that inimitable observer," as Darwin calls him, M. Fabre, from whose writings the foregoing account has been compiled. In India its place is taken by a very large wasp of a uniform steely-blue colour and a most venomous aspect. This kind makes a clay nest, of about the size and shape of a very large Brazil-nut, on the outside of some perpendicular surface, and often chooses for this purpose the walls of houses or bungaloes. I have watched it time after time flying in first with little glistening round balls of moist clay, and afterwards with curled up balls of caterpillars of about the same colour, but larger. With these she filled up one large cell, the entrance to which she then closed with more

mud. It was an interesting sight, but, to enjoy it thoroughly, one ought to be an optimist.

In the above-mentioned instances the cell which serves as cradle and tomb combined is made by the provident mother. Some wasps, however, have learnt to save time and trouble by walling the victim up in a cell of its own manufacture, or, at least, of its own choosing. This happens to a certain spider in South America, which sits in a little hole in the ground waiting for insects either to pass or come in. The wasp, which is blue like the other, but smaller than our common one, goes about from hole to hole, and when it finds one occupied by a spider, goes a little way into it, and then rushes out, hotly pursued by the owner. When on the point of being overtaken it suddenly turns, grapples with the spider, stings it, drags it back, paralysed, into its own hole, lays an egg by it, and departs, having previously blocked up the entrance with earth. The entrance of the wasp into the spider's hole, with its retreat, some time afterwards, in feigned alarm, so as to draw the spider out, is certainly an act of great intelligence. The intelligence, however, is surpassed, or exhibited in a more entertaining manner, in the case of another wasp which has been seen to creep noiselessly round to the entrance of a spider's nest, and then wriggle one of its antennæ in front of the opening. Upon this, the owner of the nest, a very large spider, came out, and was at once stung to death by the wasp. The latter then wriggled an antenna again, and upon no notice being taken,

entered the nest and killed all the young spiders, which he then carried off at his leisure.

Other wasps lay their eggs in the nests of humble bees, and the young growing up there prey upon the honey and comb. Amongst ants, again, some of the smaller species are parasitic upon the larger ones, an enforced association which may be very much to the disadvantage of the latter. Especially is this the case where an ant whose Latin name is *Solenopsis fugax*—if it has an English one I do not know it—is the unbidden guest. Lord Avebury tells us that it "makes its chambers and galleries in the walls of the nests of larger species, and is the bitter enemy of its hosts. The latter cannot get at them because they are too large to enter the galleries. The little *solenopses*, therefore, are quite safe, and, as it appears, make incursions into the nurseries of the larger ant, and carry off the larvæ as food. It is as if we had small dwarfs, about eighteen inches to two feet long, harbouring in the walls of our houses, and every now and then carrying off some of our children into their horrid dens." The insect world is particularly rich in these parasitic relations, but space will not allow me to enlarge upon them further.

Turning to birds, we meet with instances not less interesting, whilst very much less painful, since here the victimised species is only robbed by the other, and not so frequently as to prevent its making a living. The osprey, for instance, which preys almost exclusively on fish, which it hooks with its claws out of the water, is forced, though itself a large bird, to give up much of its booty to the still more powerful white-headed eagle. The latter sits on

some rocky crag or peak "that beetles o'er its base into the sea," and watches with a greedy eye the "inferior fiend," as, far below, it hovers on broad wings above its destined prey. At once the wings are closed, and the spray dashes over them as the bird precipitates itself upon a gleaming light amidst the waves. For a moment it is almost hidden in the foam and swirl, the next it emerges out of it, and mounts with powerful beats into the air, its head stretched shorewards, and its bent claws struck deep into the body of a large fish, beneath the weight of which it labours. Slowly at first, but gaining strength and speed as it ascends, it heads towards the cliff's face. Already it can see the crag on which its eyrie hangs, when, like a thunderbolt, and with the shriek or laugh of a demon, the lonely watcher, who has marked it all, hurls itself downwards on spoiler and spoil. With a quick turn the startled bird avoids the furious rush, but almost at the same moment another maniac laugh, answering the first, drowns its own note of anger and despair, as the mate of the eagle that has commenced the attack swoops towards it from a neighbouring pinnacle. All striving now on the osprey's part is in vain. Like storm-clouds the two strong robbers gather above him and descend like the jagged lightning out of them. Their screams sound almost in his ears, their claws have cut his feathers, when his own reluctantly relax their grip, and the glittering booty falls. Something falls with it—over it. There is a rushing wind of wings, an overshadowing darkness in the air, the trail of light is checked in its descent, and out of that whirlwind of excessive speed an eagle soars

HIGHWAY ROBBERY.

The osprey rose with its prey when the eagle swooped, but by swerving, the osprey momentarily escaped. The eagle is shewn stopping himself against the wind, to swoop again with fiendish cries until the osprey drops his prey in terror.

serenely to the sky bearing a fish in its claws. In their eyrie, or on a ledge of the precipice, the pair of imperial brigands share their meal, or distribute it to their eaglets. The osprey tries again, and may, perhaps, catch another fish before they have finished.

Other piratical plunderers are the skuas and some other members of the gull family. With the former the practice is more habitual, or, rather, it is pursued more to the exclusion of other habits of feeding. In the more northern parts of the British Isles—especially in the Orkneys and Shetlands—the lesser or arctic skua may be seen all day long during the breeding season, taking toll of the various sea-fowl, as they fly with fish to feed their young. One might think that when once the fish had been swallowed there would be an end of the annoyance, and that the rightful owner must, by the very nature of things, now be safe. Such, however, is by no means the case. Most birds have no difficulty in bringing up again what they have swallowed down.*

The skua, when it swoops upon a gull, does so with the deliberate intention of forcing it to disgorge the fish it has swallowed, which it then, like the eagle, catches in

* Many birds are accustomed to eject the indigestible portions of their food—bones, fur, feathers, etc., or the shells and shards of crustaceans and insects—in the form of balls or pellets, which are, indeed, very interesting objects, and both scientifically and as not leading to the extermination of the species, would make a far preferable collection to one of birds' eggs. Let anyone who doubts this pick up upon some gull-haunted island a score or so of the curious little globes made of fragments of crab-shells cemented together, which lie all about, or some of the dried frog-pellets of owls, over a marsh. He must then—or he ought to—confess that such objects are more curious, if less pretty, than birds' eggs—which, however, as

the air before it has touched the sea. Should it not succeed in doing this, the fishermen assert that it will not touch it, but invariably leaves it lying on the water, or on the land, should it chance to fall there. I have myself seen skuas act in this manner, but am not so satisfied that it is their invariable practice. Terns, should there happen to be a colony in the neighbourhood, are particularly persecuted by these skuas, insomuch that the gulls derive a distinct benefit from their presence. Puffins and guillemots are also pursued, and so ingrained is the habit of piracy that the skuas will sometimes, as it were, play at it, swooping at and chasing one another in the same manner and with the same wild cries as when they practise the art in earnest. Of course, under these circumstances neither bird disgorges to the other, and it is easy to see that neither expects the other to do so.

Though gulls uniformly suffer at the hands of the skuas, they can be pirates too amongst each other, and in harbour or where fishing-smacks are anchored nothing is commoner than to see a bird that has seized on some offal of fish thrown overboard mobbed by a host of others, till the morsel reappears again *de profundis*.

ornaments, nobody values in the least—whilst by their very nature they teach us something in regard to the habits of each species, which the latter do not. The pellets of rooks, for instance, which I have found by the hundred, composed, some entirely of innutritious vegetable materials, and others (almost entirely) of earth, are most instructive from this point of view. In fact, the results and tendencies springing out of this kind of collecting would be wholly advantageous both to birds and to natural history; so that one of the most useful things that could be started in these "killing times" would be a club or fraternity of such collectors.

Only one British gull, however, as far as I know, has taken up piracy as a profession, and that is the black-headed one. It is difficult in works of natural history to find any reference to this interesting fact, but it seems to be alluded to in one of the common or local names of this species, viz. the peewit-gull. For here the parasitic relation is between a sea-bird and a land-bird—the peewit, namely—which to me makes it still more interesting. At certain times of the year, and in certain parts of the country, almost every field or piece of land near the sea-shore in which peewits are feeding is sure to have a few of these gulls scattered about it. They stand, apparently, doing nothing, but are really keenly on the look-out, and as soon as a peewit has found anything, come sweeping down upon it. In the chase which ensues the pirate is not always successful, but very generally the peewit drops his booty, and the gull either catches it in the air or picks it up off the ground.

In all the above kinds of robberies the young of the piratical species are fed more or less frequently with the food carried off by it from the various victims. This, however, is only incidental to the main habit, so that there is little in these bird doings to remind us of those horrid relations between insect and insect, with some examples of which this chapter opened, wherein one species is wholly sacrificed for the sake of the young of another. There is, however, a nearer approach to this—since though the effects are less tragic, the governing cause is the same—in that instinct which impels some few birds to lay their eggs in the nests of other species.

Here, as the services of the foster parent are required, it does not itself suffer, but its own young perish to make place for the stranger. One most familiar example of this more advanced and complicated kind of parasitism is, of course, the cuckoo, but as the habits of this bird have been treated of in so many books, I need say nothing of them here.

## CHAPTER III

PENGUINS AND THEIR WAYS—UNCROWNED KINGS AND EMPERORS INNOCENT ARMIES—SURF MISSED IN A BASIN—DARWIN AND THE PENGUIN—HARANGUING THE PENGUINNERY.

AMONGST the strangest and, as Buffon calls them, the most unbirdlike-looking of all birds, are the penguins—an aquatic family, numbering many species, whose headquarters are the wide waters of the southern seas, as far as to the remotest parts that have yet been explored. Wherever, indeed, the land that lies around the southern pole has a coastline, it is probable that penguins lay their eggs and rear their young; and the best hope for their continuing to do so is that some parts of this area may be too remote, or have too rigorous a climate to admit of its being often visited by mankind. Wherever sailors go, these poor birds, besides being plundered of their eggs, are destroyed in thousands, so that if every one of their breeding-haunts were to be visited each year, they would before long become extinct. On some islands, indeed, they are protected, but a modicum of protection accorded to a bird is not of much avail as against a vast amount of slaughter. Independently of what it may suffer in unequal warfare with the greed and brutality of man, every species has to hold its own in the

general struggle for life, and when reduced to very small numbers, it may be unable to do so. The Falkland Islands, which lie far down off the western coast of South America, were once amongst the most popular breeding-resorts for various species of penguins, but "now," says Professor Newton, "owing doubtless to the ravages of man, whose advent is always accompanied by massacre and devastation on an enormous scale, it does not nearly approach to what it is in other places—the habit of the helpless birds, when breeding, to congregate by hundreds and thousands in what are called penguin rookeries, contributing to the ease with which their slaughter can be effected. Incapable of escape by flight, they are yet able to make enough resistance or retaliation (for they bite powerfully when they get the chance) to excite the wrath of their murderers, and this only brings upon them greater destruction, so that the interest of nearly all the numerous accounts of these rookeries is spoilt by the disgusting details of the brutal havoc perpetrated upon them." It is to be hoped that the rising generation, by having stronger views upon these things than have hitherto been held by the great majority of people, will gradually bring them to an end. Otherwise books like this will become more and more difficult to write—for there can be no romance of animal life when animal life has disappeared, and the rapidity with which it is disappearing all over the world is dreadful to think of.

In all the penguins the wings have been converted into a pair of flippers or paddles, incapable of flight, but with which the birds can propel themselves with wonderful

speed in the water. It is only, however, when they dive that they use them in this way. Until then they swim with their webbed feet alone, like a duck, but as soon as they go down the wings are extended, and rapidly beat the water as if it were the air, whilst the feet close together and trail behind them like a tail. These birds, in fact, fly through the water, as others do through the air, but they do not look like birds at all, but much more like seals; and indeed the whole shape of a penguin is so much like that of a seal that one might almost mistake him for one, if it were not for his long, narrow bill. This, however, is only when he is in the water, and especially whilst swimming under it—if ever one has the chance of seeing him do that. When on land the bird presents a very different appearance. He then stands bolt upright, exposing, in a front view, the whole surface of throat, chest, and the lower ventral region. For the most part this is of a dazzling white, but in the king and emperor penguins the white passes upon the chest into a light but very lustrous yellow, which, intensifying as it mounts upwards, shines, at last, like the very sun itself. It is like a pale gold sunrise over pure white virgin snow, and as the beams rise higher they get more golden by degrees. Above this zone of colour the throat, as far as the bird's forehead, is black, but with a vivid golden band on either side, whilst the beak is of a coral red. This distribution and contrast of colouring, with the beauty of the hues themselves, give to such large, upright birds a very striking and distinguished appearance, so that, though the purple robe and the diadem

be wanting, one may well think, as one looks at them, that no real king or emperor, with these to help him, ever looked the part to greater perfection than do these two grand penguins who respectively bear their titles. But if one by itself looks magnificent—and to acknowledge that it does one has only to visit the Zoological Gardens, where a specimen is kept in a basin—how must hundreds of them look, standing side by side in long rows, like so many regiments of soldiers? That, indeed, is the general simile which those who have seen these birds in their antarctic dwelling-places make use of, in order to describe their appearance to more stay-at-home people, and the resemblance is increased by their sometimes walking one behind the other in single file, especially when coming up from the water to take their place on the eggs. They walk upon their toes alone, as do some of our own sea-birds—the puffin, for instance, and often the guillemot—but when standing sink down upon the shank—or tarsus, as it is called—that bone which corresponds with our own ankle.

The regimental manner in which penguins, when collected in large numbers, arrange themselves, and the soldierly appearance which they then present, is remarked upon by Dr. Bennett in his account of their habits, as witnessed by him on Macquarie's Island, in the South Pacific Ocean. "The number of penguins," he says—he is speaking of the king penguin—"collected together in this spot is immense, but it would be almost impossible to guess at it with any near approach to truth, as during the whole of the day and night thirty or forty thousand

of them are continually landing, and an equal number going to sea. They are arranged, when on shore, in as compact a manner, and in as regular ranks, as a regiment of soldiers, and are classed with the greatest order, the young birds being in one situation, the moulting birds in another, the sitting hens in a third, the clean birds in a fourth, etc., and so strictly do birds in similar condition congregate that, should a bird that is in moulting intrude itself amongst those which are clean, it is immediately ejected from amongst them. The females hatch their eggs by keeping them close between their thighs; and if approached during the time of incubation, move away, carrying their eggs with them. At this time the male bird goes to sea and collects food for the female, which becomes very fat. After the young one is hatched —for these large penguins lay but a single egg—both parents go to sea and bring back food for it: it soon becomes so fat as scarcely to be able to walk, the old birds getting very thin. They sit quite upright in their roosting-places, and walk in the erect position."

When arrived at the beach, preparatory to taking the water, they fall forward on their breasts, and then shoot, with the greatest ease, through the heavy surf which breaks continually on these southern, though arctic shores. It has been supposed by members of the Zoological Society that these birds, when in confinement, miss this tumbling surf, and that the absence of the exhilaration which they experience in riding or plunging through it prevents their being bright and happy. I can well believe that they miss the surf, but as penguins at the Gardens are

allowed only a very small tank or basin, whilst some are even kept in hutches without any at all, the probability is that they miss the wide expanse of water they have been accustomed to live in still more. I think if they had something a little more like the sea they could do better without the surf, and if I had anything to do with the laws of the country I would make it illegal to keep either penguins or any other kinds of swimming-birds without giving them a sheet of water at least as large as a swimming bath. Even that would be very small, but, at least, it would be better for them than a wash-basin, which is more like what they get now. Artificial rocks and rocky shores, and ice, whenever they could get it, would also be very good things for penguins in captivity.

Most of the penguins, as might be supposed, considering the life on the ocean wave which they lead, are flesh-eaters, but the king and the emperor prefer a diet of crustacea, varied, according to the Rev. J. G. Wood, with cuttle-fish.

The skill with which the smaller kinds catch fish is quite wonderful, but I do not know that it is more wonderful than that displayed by other diving-birds that live in the same way. The little puffin, for instance, that with its white breast and gaily-coloured beak and feet, may be called the penguin of our shores, flies in regularly from the sea to feed its young with quite a number of fish in its bill. I have counted almost a dozen sometimes, and how it could have caught any one of them, except the first, without letting the others go, I can hardly imagine. I think, however, that each fish is killed as the

bird catches it, being nipped right across by the sharp, razor-like beak. But even so, it seems wonderful that the beak can be opened whilst the bird is swimming rapidly without the force of the water carrying the fish, either alive or dead, out of it. I do not know if the penguin can add up fish in his bill in this way, but I rather doubt it, because it is a long, thin bill, more like the guillemot's than the puffin's, and I have not seen the guillemot flying to feed its young with more than one fish at a time. The razor-bill, however, whose beak, as its name suggests, is flat and blade-like, is able to perform this feat.

The king and emperor penguins are the two giants of their race, but there are a number of species much smaller, some of which are crested. These latter are called "macaronis" by the sailors, perhaps because the crest gives them a smart appearance, for "macaroni" is the Italian word for a fine gentleman, and used to be used a good deal in England once. Others are called rock-hoppers, because when they are in a hurry, and want to go quickly, they hop or jump with both feet off the ground, and get, in this way, from rock to rock. It is these smaller kinds of penguins that come to the Falkland Islands to lay their eggs, whilst the two great penguins breed only within the solitudes of the antarctic circle. Captain Abbott, of the Falkland Islands Detachment, has given a short account of the former, which contains some interesting passages. Speaking of the rock-hopper penguins, he says: "The space occupied by some of the breeding-places is nearly 500 yards long, by about 50

broad, and their eggs lie so close together that it is almost impossible to walk through without breaking some of them. I have often wondered, on disturbing these birds, and driving them away from their eggs, how, on their return, they could pick out their own among so many hundreds. Yet this they do, walking back straight to their eggs and getting them between their legs with the utmost care, fixing them in the bare space between the feathers in the centre of the lower part of their belly and gradually lowering themselves till their breasts touch the ground, the male bird of each pair standing upright, alongside of the female."

In regard to another species, called the gentoo penguin, he says: "Some of their breeding-places are near the sea, and, generally, near a freshwater pond; others, however, are several miles inland. Why they should select these latter places—so far from salt water—is a mystery. The grass from the sea to the breeding-ground is trodden down and made into a kind of road by detachments of these birds, of from ten to twenty, going to the sea and returning. They make no nest, but lay in a hollow in the earth; they occupy a square piece of ground and deposit their eggs, two in number, as close to one another as they can sit. When the young birds are old enough they all go to sea, and only occasional stragglers are found on the coast at any other time of the year." Elsewhere Captain Abbott tells us that the ground about these "rookeries" is covered with small, round stones, which these birds eject from the bill on coming up from the salt water, in green masses, about the size of a shilling. It was on

the Falkland Islands that Darwin, the great naturalist and philosopher, had an experience with a penguin, of which he gives the following interesting account: "Another day, having placed myself between a penguin and the water, I was much amused by watching its habits. It was a brave bird, and, till reaching the sea, it regularly fought and drove me backwards. Nothing less than heavy blows would have stopped him; every inch he gained he firmly kept, standing close before me, erect and determined. When thus opposed he continually rolled his head from side to side in a very odd manner, as if the power of distinct vision lay only in the interior and basal part of each eye." This bird that thus measured its strength with the celebrated philosopher, was of a kind called the jackass penguin, a name which it has received "from its habit, whilst on shore, of throwing its head backwards and making a loud, strange noise, very like the braying of an ass; but while at sea, and undisturbed, its note is very deep and solemn, and is often heard in the night-time."

Darwin further tells us that "in diving, its little wings are used as fins; but on the land as front legs. When crawling, it may be said, on four legs through the tussocks, or on the side of a grassy cliff, it moves so very quickly that it might easily be mistaken for a quadruped. When at sea, and fishing, it comes to the surface for the purpose of breathing with such a spring, and dives again so instantaneously, that I defy anyone, at first sight, to be sure that it was not a fish leaping for sport." These observations were made by Darwin during

his famous voyage round the world in the *Beagle*, which lasted five years, and of which he has given us the delightful account, from which this passage is taken. The commander of the *Beagle* was Captain FitzRoy, who has also told us something about the penguins. He says that, when feeding its young, "the old bird gets on an eminence, and makes a great noise between quacking and braying, holding its head up in the air, as if it were haranguing the penguinnery" (a much better word, I think, than the "penguin-rookery"), "while the young one stands close to it, but a little lower. The old bird, having continued its chatter for about a minute, puts its head down and opens its mouth widely, into which the young one thrusts its head, and then appears to suck from the throat of its mother for a minute or two, after which the chatter is again repeated, and the young one is again fed."

## CHAPTER IV

WONDERFUL BIRDS'-NESTS—A CITY OF GRASS—BIRD WEAVERS AND TAILORS—BIRDS THAT MAKE POTTERY—EVOLUTION IN BIRD-ARCHITECTURE.

THE penguins, like others of the diving sea-birds—our own guillemots and razor-bills, for instance—make no nests. Birds, however, taken as a class, are remarkable, as we all know, for the wonderful structures which they build, to lay and incubate their eggs in, and sometimes, as we shall shortly see, for other purposes as well. Chief, perhaps, amongst these wonderful builders come the weaver-birds, and especially that species which is named, *par excellence*, the sociable weaver-bird or grosbeak—for most of them are sociable in a greater or less degree. Though not more than about five inches long and of a plain appearance, these little birds, by uniting together, make, perhaps, the largest nest or structure that any bird makes, it being large enough to conceal four or five men from view, if they should get behind it. It is built, however, in a tree, and entirely of a very long, tough, and wiry kind of grass, called Bushman's or Booschmannie grass, because it is plentiful where the Bushmen used to live—for the grass has outlived the Bushman. This grass the birds pull out

of the ground, and when they have got a good bunch of it they fly to the tree they have chosen—which is often the pretty mimosa, or *kameel-dorn* of the Boers—and lay it across a properly shaped branch, so that it hangs down upon either side. Then they plait and weave each row of ends together, and by constantly bringing more grass and continuing the process, pushing it out, as they go, so as to make it bulge, gradually, on each side of the branch, they make, at last, a hollow, thatched structure, narrow at the top, where it is supported by the branch, but getting wider as it descends, like the thatched roof of a cottage, which, indeed, it much resembles. It is higher, however, in proportion to its length, and so has roughly the shape of a beehive or diving-bell; or, again, it may be widened out at the top and made more rounded, so as to resemble the head of a gigantic mushroom. The structure is, of course, continuous all round, the two rows of hanging grass-stems having been woven together by the birds, at either end. Inside this hollow dome, or roof, the actual nests are now placed, each pair of birds building a separate one, though as they are all woven together, the whole of them, with the covering thatch, has the appearance of one structure when finished. The nests descend within the roof, to the same depth, so that the central hollow becomes filled up with a mass of material, within which, however, are a great number of smaller hollows—each one the nest of a pair of weaver-birds—like the cells of a honeycomb, but with wider spaces between each. A sort of thatched honeycomb, indeed—though without the honey—is what the completed structure may most be said

to resemble, but really to complete it, takes many years; for it is not in one season, nor two, that the whole of the roof, or dome, is filled up. Indeed, when it is, it may be surmised that the numerous colony inhabiting it, which may then amount to some two or three hundred souls, or perhaps more, is shortly about to emigrate, since the weaver-birds, like most other ones, do not care to occupy the same nest, for two seasons in succession. Instead, when the breeding-time comes round again they build another one, and it is in this way that the whole space of the dome is gradually taken up, though a large part of it always remains unoccupied. As many as 320 nests have been counted, which would make 640 birds, were there a pair to each; but a considerable number of them—perhaps half—must have been old ones, no longer in use. What proportion such old nests bear to the new ones I do not know, so when I say that a colony of weaver-birds may number some two or three hundred souls only, it is in order to be on the safe side.

But how delightful to see and be able to watch such a colony as this, clouds of the birds continually flying in and out, or clustering together amongst the branches, or on the outside of the thatched roof of their common house, all chirping and twittering, flying off every now and then with a whirr, and descending again with another one. Add to this, the ordinary daily vivacity of the scene, the occasional approach of a hawk or a monkey—a baboon, perhaps, or a whole party of baboons. How great then would be the commotion, hundreds of incensed, twittering little creatures flying out in swarms

and dashing about the intruder, who, being thus mobbed, would probably soon find discretion to be the better part of valour. The hawk, however, might, and probably frequently does, take his toll before going. As in our own country, he is no doubt accustomed to being mobbed, and does not mind it much. With regard to the monkeys, they would be extremely glad to get any of the weaver-birds' eggs, and still more, perhaps, the birds themselves, but the nest—to give the whole collective structure this name—is built in such a way as to render this difficult. It hangs in the air, and slants outwards as it descends, so that a small monkey getting on the top of it might find it difficult to avoid slipping down, whereas the massiveness of the structure is such as to deter even the baboons from trying to pull it to pieces. Whatever the reason, they do not apparently endeavour to do so. Perhaps the swarm of angry birds alone is sufficient to keep them off, or possibly, being always accustomed to see these great house-like structures amidst the branches, they look upon them as a part of the tree itself. The birds, of course, would not be likely to choose the most exposed branches to build on, but still, judging from the illustrations one sees, these nests cannot be said to be inaccessible. The smaller monkeys, however, are not so very common in South Africa—whilst baboons are less arboreal than monkeys generally are. Some people write, indeed, as if they had given up climbing altogether, but if they had seen them, as I have, walking out along the branches of high trees on the banks of the Limpopo, and on, from tree to tree, they would not go as far as that.

However, it is to these two circumstances, as I believe, that these great social nests of the Weaver-birds in South Africa, principally owe their immunity.

Others of the family make separate nests, which they attach to the end of leaves, twigs, small branches, or slender swaying creepers that hang down over water—generally a river—so that they cannot be got at by any monkey, however small, or even by snakes, which are still more redoubtable enemies. These graceful "pendent nests and procreant cradles," swung and danced by the lightest air, are of all sorts of shapes—rounded, or gourd-shaped, or rounded with a sort of stocking hanging down from it—and are all of them beautifully woven with the stems and blades of various grasses.

In this plaiting of the natural growing grass into a fabric, one might think that the height of bird architecture had been reached, but there is a Tailor-bird as well as a Weaver-bird, and what he does is perhaps even more wonderful, since he uses a needle and thread, his bill doing duty for the needle. Having picked some holes along the edges of two or more leaves that hang near to one another, the bird passes a thread through them, in and out, all the way along, and then draws them together with it, tightening the thread, as we should do, and making a knot at the end of it, so that it may not come undone. It has previously made another knot, or bunch, at the other end of the thread, to prevent that slipping either; but how it does it, or how it makes the thread that it uses (for it is said to manufacture it, not merely to take a fibre or grass-stem, at least not always) nobody

seems to know. As the Tailor-bird is a native of India, and is not shy, but comes into gardens and compounds, where, no doubt, it often builds its nest, this want of information is not much to the credit of naturalists in that country. But perhaps it is a difficult thing to see, however near the bird may come. Jerdon, in his *Birds of India*, tells us that "it makes its nest of cotton, wool, and various other soft materials," and that "it draws together one leaf or more—generally two leaves—on each side of the nest, and stitches them together with cotton, either woven by itself, or cotton thread picked up; and after passing the thread through the leaf, it makes a knot at the end of it." This sounds as if the nest was made first and the leaves drawn round it afterwards, but nobody would suppose this, or, indeed, that it was possible, so I am not going to believe it till somebody who has seen the bird at work tells me that this is its *modus operandi*.* The Tailor-bird is quite small and of sober appearance. It has a long tail though, which, in the illustrations, sticks right up, whilst the beak has a very delicate tactile appearance, almost suggesting a needle, though not quite the kind that we use. There is, too, a certain little dapper, demurely self-satisfied look about the bird—I mean in the illustrations, for I have

* The nest is contained within the hanging leaves, which are its sole support—this, at least, is my impression. Now if the nest is made *first*, on what does it rest—where *is* it—before the leaves wrap it round?

In the *tout ensemble* the leaves correspond to the outer cup of the nest, and the nest proper to the inner lining. It is the latter which, in the ordinary building of a nest, comes last.

never seen it—as if it knew what it could do, and was proud of being able to do it. If it is, nobody, I think, need blame it.

Besides birds that weave or stitch their nests, thus associating themselves, as it were, with two of the oldest and most respectable guilds of human society—there are others that belong to a third guild, and may be called potters, inasmuch as they make theirs of clay, with only a small admixture of other substances. The Oven-bird is, perhaps, the chief of these, a bird allied to our own little tree-creeper, but about the size of a lark. It lives about the banks of South American rivers, and with the mud, or clay, that it finds there, stiffened with grass, bits of straw, or other vegetable fibres, it builds its very remarkable nest, which, "in shape, precisely resembles an oven or depressed beehive," and is soon baked almost as hard as a brick, by the heat of the tropical sun.

The outer clay wall of this strange nest is nearly an inch in thickness, and, as there are two interior chambers, the size of the whole is very considerable, in proportion to that of the bird. It is, therefore, a conspicuous object in itself, and not the slightest attempt is made by the bird to conceal it. "It is placed," says Darwin, "in the most exposed situations, as on the top of a post, a bare rock, or on a cactus." The entrance is at one side, and in the larger of the two compartments, which is the inner one, the nest, which is a soft bed of feathers, is placed. What the outer compartment is used for, or whether it has any special use, I do not know. Wood says that the male probably sits in it, whilst Darwin thinks it merely forms

a passage, or antechamber, to the true nest. As to a very learned work written by several learned people, which I am always looking at, and always to little or no purpose, it says nothing, but merely tells you that so and so has mentioned the bird and somebody else said quite a good deal about it—and it evidently thinks this enough, though I don't.

Then there is the Pied Grallina, an Australian bird that makes a nest which resembles a large clay bowl or pan, and another, called the Fairy Martin, belonging to the same country, whose nest, built wholly of clay and mud, has very much the shape of an oil-flask with a rather short neck, which projects forwards and downwards, and has an aperture at the end, by which the bird enters. Like those of other swallows and martins, these nests are built several together, and are fixed to the face of a cliff or the hollow of a large tree. Our own little martin-nests are not quite so remarkable as these, but they are sufficiently curious, and it is interesting that in the swallow family we at last get to birds which make their nests—I mean, of course, the exterior part—entirely of mud, without any straw or grass being mixed up with it. It is interesting, I think, because my own idea is that mud came first to be used in nest-making, through its adhering to the roots of grasses and water-plants, and that in the bits of straw and fibre, mixed up in the pottery of such accomplished mud-builders as, say, the Oven-bird, we see the last traces of the way in which these structures began. It was watching blackbirds build that first gave me this idea, for the blackbird plasters the cup of its nest

with mud, as the thrush does with cow-dung and rotten wood; yet this mud is procured in the way indicated, and the plants to which it adheres form the bulk of the burden, and are of more importance than it is in the architecture of the nest. Gradually, as I believe, the mud got more and more, and the vegetable alloy less and less, till, at last, in the nests of some species mud only came to be used.

But we reach a further stage where mud has been given up, and something else adopted in its place. Thus the thrush, whose nest, up to a certain point, much resembles that of the blackbird, makes a cup to it, not of mud, but of cow-dung and rotten wood mashed together. That it once used mud, however, but that in civilised lands, rich in cows, the other substance gradually took its place, I have myself little doubt.

Finally, in the nest of the Edible Swallow, or rather Swift, of India and the Malay Archipelago, we have, perhaps, in its way, as wonderful an example of bird architecture as any that exists. These nests are attached to the face of precipices, and both in this and their general appearance resemble those made by the house-martin, who, before there were houses, no doubt chose precipices too. They are open, however, not domed, so that the resemblance is to a martin's nest about threequarters finished, rather than to a completed one. Who can doubt, having regard both to their shape and the site chosen for them, that the bird that makes these nests, or rather its ancestors, used, ages ago, to make them of mud. But this mud was mixed with the salivary secretions—just

as in the case of the house-martin now—and these becoming, as the glands developed, more and more viscous and glutinous, as well as more copious, began at last to do duty for the original material, so that now they have entirely taken its place. The substance thus used is, at first, in a semi-liquid state, but dries and hardens till it becomes quite solid. On being steeped in hot water, however, it again softens into a sort of jelly, which is made into soup by the Chinese cooks, and eaten with the greatest possible relish by the Chinese epicures.

## CHAPTER V

BOWER-BIRDS AND GARDENER-BIRDS—HOW BIRDS SHOW OFF—A MALAY TRAP—CRIMSON COMPETITION—LOVE IN A TREE-TOP.

AS we have seen in the last chapter, some nests of birds are very wonderful buildings, but there are some birds which make much more wonderful buildings than nests. These are the Bower-birds—a family allied to that of our crows and starlings—whose habitat is Australia and some of the adjacent islands. It includes a good many species, and all of them, besides the nest, make another and quite different structure, which is known as the "bower," but for which "playground" or "garden" is, perhaps, a better name. All three words, however, have something to commend them, for not only do the birds play and sport in and about these rustic buildings, and decorate them sometimes with leaves and flowers; but it is here, also, that the sexes resort, to court and choose one another before the more prosaic duties of matrimony begin. Whilst the nest, therefore, is the nursery, this other structure may be looked upon as the bower of bliss. Generally the birds make it of sticks, grasses, or other materials belonging to the vegetable kingdom, but it differs in each species, so the best way is to describe what it is like in a few of the more salient

instances. The Satin Bower-bird makes a sort of platform of sticks, which it weaves together, so that they are firm enough for it to run over. This is the floor of the bower, and now come the walls, which are made of sticks too, but of another kind—long, flexible twigs, which the bird places upright and opposite to one another, on the two longer sides of the platform, which is somewhat oblong in shape. The thicker ends of these twigs rest on the platform, or the ground on each side of it, whilst the thin tips bend inwards till the two walls almost meet at the top, to make a sort of vaulted thatched roof. The whole forms a sort of rustic arbour, open at either end, so that the birds can run through it. This they delight in doing, and in order that the sticks may offer no obstruction as they dart along, they are careful, when minor twigs branch off from them, to place them so that these point outwards. Having made their bower, the next thing the birds do is to decorate it. Anything they can find that is bright, or gaily-coloured, such as feathers, bleached bones, snail-shells, leaves, flowers, etc., they pick up and bring to their bower. The feathers, or flowers, they hang about the rustic walls, whilst they drop the bones and shells in a heap outside each of the entrances.

As the birds are always adding to these collections, and keep up and repair their bowers from year to year, these curious, white, glistening heaps grow and grow, until sometimes they are large enough to fill a cart. Quite a number of birds—perhaps a dozen or more—come to play and sport at these bowers, or summer-houses. They run through and in and out and round about them,

chasing one another, and having all manner of fun. The cock of this species is a most beautiful bird, and it is here that he shows off his glossy, blue-black body and velvety wings to the female, who is of a sober green, and not nearly so handsome. It is because the cock's feathers are so smooth and shining, that he is called the Satin Bower-bird. The female has not this satiny appearance, but, like other ladies, she has to take her husband's name. The size of the birds is about that of a jackdaw—at least I have seen them in the gardens, and they looked to me almost as large. Mr. Gould, speaking of the bower of this bird, says: "It has now been clearly ascertained that these curious structures are merely sporting-places in which the sexes meet, and the males display their finery and exhibit many remarkable actions, and so inherent is this habit, that the living examples which have, from time to time, been sent to this country, continue it even in captivity. Those belonging to the Zoological Society have constructed their bowers, decorated and kept them in repair, for several successive years." A gentleman who kept these Bower-birds in captivity, writing to Mr. Gould, says: "My aviary is now tenanted by a pair of satin-birds, which for the last two months have been constantly engaged in constructing bowers. Both sexes assist in their erection, but the male is the principal workman. At times the male will chase the female all over the aviary, then go to the bower, pick up a gay feather or a large leaf, utter a curious kind of note, set all his feathers erect, run round the bower, and become so excited that his eyes appear ready to start from his head,

and he continues opening first one wing and then the other, uttering a low whistling-note, and seeming to pick up something from the ground, until at last the female goes gently towards him, when, after two turns round her, he suddenly makes a dash, and the scene ends."

I forgot to say that Mr. Gould once found a stone native tomahawk, amongst the heap of things that this bird had collected at its bower, and when, in Australia, either a native or a white man loses anything in the least ornamental—anything, in fact, that is not too heavy for a Bower-bird to carry—the first thing he does is to go to all the bowers in the neighbourhood, and see if it has been taken to any of them.

The Spotted Bower-bird is as beautiful, perhaps, as the last, and its bower or sporting-place is a still more wonderful structure. Mr. Gould describes it as considerably longer than that of the Satin Bower-bird—three feet long sometimes—so that it is more like an avenue than a bower. "Outwardly," he says, "they are built of twigs, and beautifully lined with tall grasses, so disposed that their heads nearly meet" (others, however, who have seen them, say that they are much more open at the top); "the decorations are very profuse, and consist of bivalve shells, crania of small mammalia, and other bones, bleached by exposure to the rays of the sun, or from the camp-fires of the natives. Evident indications of high instinct are manifest throughout the whole of the bower decorations formed by this species, particularly in the manner in which the stones are placed within the bower, apparently to keep the grasses with which it is lined fixed

firmly in their places; these stones diverge from the mouth of the run, on each side, so as to form little paths, while the immense collection of decorative materials are placed, in a heap, before the entrance of the avenue, the arrangement being the same at both ends. In some of the larger bowers, which had evidently been resorted to for many years, I have seen half a bushel of bones, shells, etc., at each of the entrances." Mr. Gould goes on to say that he "frequently found these structures at a considerable distance from the rivers, from the borders of which the birds could alone have procured the shells, and small, round, pebbly stones," and that "their collection and transportation must, therefore, be a task of great labour."

The "bower" or, rather, the little rustic village, made by the beautiful Golden Bower-bird—a name which is as good as a description—is still more wonderful than either of the other two; indeed it is like a fairy-tale to read about it. This species chooses out two trees that stand near one another, and round the trunk of each it piles up an enormous quantity of small sticks and twigs, in the shape of a cone or pyramid. One of these stick pyramids may be as much as six feet high, and bulky in proportion, but the other is not nearly so large, standing only about eighteen inches from the ground. Having reared the two pillars, as it were, the birds—for several may join in the labour—proceed to arch over the space between them. For this purpose they search out the long stems of creepers that grow in the woods, and having fixed them, by an end, to the top of one pile, stretch them tight, and

trail them over the other, thus making a covered walk between the two. Then they bring white moss, and festoon the pillars with it, and into the leafy roof they weave clusters of green fruit, like grapes, that hang down from it, so that it looks as if they had trained a vine over a trellis. Yet still the birds are not satisfied. All around the great central arbour they make little dwarf huts, or wigwams, of the growing grass, bending the stems together till the ends meet, and then thatching them over with a horizontal layer of twigs. When all is finished, they chase each other through their trellised arbour and round and round their little grassy wigwams —or "gunyahs" as they are called by the natives—the males, all resplendent in their beautiful golden plumage, glancing in and out amongst them, like so many little suns.

But the wonder of these things goes on increasing, and at last we come to the Gardener-bird, who, as its name implies, lays out a regular garden with a lawn and flower-beds, and a summer-house in it, as well. The lawn, however, is made of soft, verdant moss, and stuck about in it, at various points, are the brightest blossoms and berries that the country where the bird lives—which is New Guinea—can afford. As these wither, the "gardener" takes them away, and brings new ones in their place. The summer-house, which is about two feet high, is built of sticks round a small tree, which projects through the top and makes a central support. From this the walls radiate outwards, in the shape of a tent or wigwam, and, to make them look smooth and pretty, they are all

covered over with orchid stems. On the top—either round the projecting tent-pole, or over it—the birds put moss, arranging it in the form of a sugar-loaf. At one side the wigwam is left open, and it is in front of the opening that the lawn and flower-beds are placed. The birds can sit in their tent, or summer-house, and look out at their garden, or walk about their garden and look at their pretty summer-house; and if that is not romance in animal life I am sure I do not know what is. The bird that does all this is not very handsome itself, and this makes its appreciation of the beauty of a garden and summer-house—which must be much the same as our own—all the more remarkable. Signor Beccari, an Italian gentleman, was the first to discover and describe the species, and he has made a drawing of it and its garden, which may be seen in volume ix. of *The Gardener's Chronicle*, at p. 333. One can only hope that he did not "obtain," as they call it, any specimens—for to kill a creature that makes a garden and looks after the flowers in it, taking them away when they wither and bringing fresh ones in their stead, is, to my mind, to do something but little short of murder. Perhaps if it watered them as well it really would be thought wrong to take such a bird's life: but where are we to draw the line?

Many of these Bower-birds are wonderful mimickers, and can reproduce all sorts of sounds so exactly that people in Australia are often taken in by them. Mr. Morton, of Benjeroop, relates how a neighbour of his had been driving cattle to a certain spot, and on his way back

discovered a nest in a prickly needle-bush, or hakea tree. While "threading the needle branches after the nest (to take, that is destroy it, of course), he thought he heard cattle breaking through the scrub, and the barking of dogs in the distance, and at once fancied his cattle had broken away, but could see no signs of anything wrong. He heard other peculiar noises, and glancing at his dog, as much as to say, 'What does it mean?' he saw the sagacious animal, with head partly upturned, eyeing a spotted Bower-bird, perched in the next tree."

The structures which we have been here considering are of so extraordinary a nature, that they more arrest our attention than do those special activities relating to courtship and matrimony, for the due performance of which the birds have erected them. With all other species, however, in which these rites are a special feature, the exact converse is the case; or, rather, whilst a special place is sought out for their indulgence, no structure in connection with them is made. In some few cases, however, we perhaps see the beginnings of this. The male argus pheasant, for instance, displays before the hen in a little open space in the jungle, to which, in the breeding season, he day after day repairs, and though he builds nothing, he is most assiduous in keeping this space clear and clean, so that if a leaf or a twig, or anything else, gets into it, he takes it up and drops it outside. So pronounced, indeed, is this habit, that the Malays have learnt to take advantage of it to the birds' destruction. They cut off a long shaving from the stem of a bamboo, and tie one end of it to a peg, which they drive into

the ground in the centre of the clearing. Finding that an ordinary pull will not remove the untidy-looking thing, the irritated bird at length seizes it with his bill by the free end, and twisting his neck two or three times about it, makes a violent spring backwards, with the result that he cuts his throat, for the thin edges of the bamboo are almost as sharp as a razor.

The display, as it is called, of the argus pheasant is a most interesting thing to see. The secondary quill feathers of the male are immensely developed, and very beautifully and æsthetically ornamented with a row of circular spots, so finely shaded that they stand out in perspective, like a real ball, as though drawn by a clever artist. Under ordinary circumstances these lovely ornaments are hidden, but when the wings are expanded they make, together, a great circular shield, which is thickly studded with them; and this starry firmament the male, when he wishes to make an impression, offers suddenly and with *empressement* to the gaze of the female. The lower feathers meet together in front of the bird's head, so that, in order to judge of the effect he is making, he has to thrust it between two of them, and thus peep out at the hen. At the same time he fans his tail and elevates it, so that the two very broad and very long plumes which it contains nod above the soft splendour of the wings. To see several of these magnificent birds—as large almost, at least in their then appearance, as peacocks—contending thus for the favours of the female, must be a most magnificent sight, to be excelled only, perhaps, by the similar rivalry of peacocks themselves in some

tiger-haunted jungle of India. Both these birds belong to a family which is famous for displays of this sort. They are striking enough in our own pheasant, which, however, comes originally from the East, and rise to a maximum, at least in Europe, in the blackcock and capercailzie. I have myself seen both these birds exhibiting to the females, in Norway.

The cock-of-the-rock offers another striking example of the importance of courtship amongst birds. The male of this species is, from beak to tail, of a deep orange, or, more beautiful still, of a brilliant blood-red colour. From the beak one may well say, for this, to the very tip, as well as the head itself, is covered with, or rather buried in, a magnificent crescent-shaped crest, which, by obscuring the usual contour of that region, gives a touch of *bizarrerie* to a *tout ensemble* sufficiently splendid. As in the case of the argus pheasant, a little open space is selected, the mossy turf of which soon becomes pressed smooth by the tramplings of the birds' feet. In it the adorned males, to the admiration of their more sombre-coloured lady-loves, dance and spring about, engaging, from time to time, in fierce and valorous conflicts. Whilst not in the ring, as one may say, the birds often fly from one to another of the neighbouring trees, to the trunks of which they sometimes cling, all in the greatest excitement. As in all other cases of the sort, the females are supposed to accept, by preference, those males for their husbands, whose plumage, when thus shown to advantage, creates the most dazzling effect.

This is the theory of sexual selection by which Darwin

accounts for most of the very beautiful colours and markings throughout nature. But though his arguments have never been shaken, whilst the evidence on which they are based has been most effectively supplemented,* yet naturalists, as a body, seem determined to ignore both the one and the other, and to see in the most striking patterns and conspicuous hues, a "protective resemblance" to the surrounding landscape, which, if it really exist for any man, must be due rather to some personal cause, such as strong imagination or weak eyesight—or a combination of the two—than to any objective reality. There is no animal now, in fact, however conspicuous it may be to the eye of the savage, that is not pronounced "almost invisible" by some spectacled old gentleman or another, and I feel confident myself that, were a red or blue lion to step off a public-house and walk in full view down the street, it would be thought to "blend wonderfully" with the houses on either side, by these thoroughgoing advocates of the protective theory. Darwin, however, who has pointed out so many cases of assimilative colouring, all of which are accounted for on his theory of natural selection, did not believe that the tiger or zebra were protected in this way, nor would he, probably, have endorsed the red lion.

It is amongst the birds of paradise, however—and especially in the case of the great bird of paradise, the

* Particularly and most remarkably in the case of spiders. In one species, for instance, the males are of two patterns, as one may say, each of which dances before the female, in its own way, which is very different from that of the other (see Professor Poulton's *Colours of Animals* in the "International Scientific Series").

loveliest, perhaps, of all—that we see the courting antics of birds exhibited, if not in their greatest perfection, at least in their most overpowering beauty. Here the gathering-place, instead of being on the ground, is amongst the tree-tops, and a tree of a specially lofty kind is chosen, which, by virtue of its spreading head and scantiness of foliage, is well adapted for the purpose. Here, in the early morning, the birds assemble, and the males, which alone possess those magnificent plumes, or, rather, fountains of feathers, that spring from beneath the wings on either side, display them now to the best advantage, elevating them, spreading and shaking them out, and keeping them all the while in a state of quivering, tremulous vibration. Amidst this soft and spray-like shower, tinted of a soft mauve and a deep golden orange, the emerald feathers of the neck and the pale, straw-coloured ones of the head, as the bird turns it excitedly from side to side, gleam and sparkle, whilst the wings are raised and opened, making, as it were, a basket out of which the plume-jets spring. In the intervals between these exhibitions, the birds fly from branch to branch of the wide-spreading tree-top, their plumes now trailing behind them, and looking as beautiful, almost, in another way, as they did just before when specially exhibited. Not that there is much order in the birds' performances, or, rather, it is order in disorder. Though rivals, emulous of one another's actions, yet each of them plays its own independent part. No two, it is probable, out of, perhaps, a score composing the assembly, acts in just the same way at just the same time, and thus the whole space is filled,

each moment, with a varied scene of exquisite, ethereal loveliness.

Professor Wallace—who does not, however, as it would appear, speak from personal knowledge—tells us that, "at the time of the bird's greatest excitement, the wings are raised vertically over the back, the head is bent down and stretched out, and the long plumes are raised up and expanded till they form two magnificent golden fans striped with deep red at the base, and fading off into the pale brown tint of the finely divided and softly waving points. The whole bird is then overshadowed by them, the crouching body, yellow head, and emerald-green throat forming but the foundation and setting to the golden glory which waves above. When seen in this attitude the bird of paradise really deserves its name, and must be ranked as one of the most beautiful and most wonderful of living things." Nothing is said about the hens here, but in the following description—the only one I know which comes from an eye-witness—they play their part, as will be seen, and as I have no doubt they should do in the other. The birds here seen belonged to another species of the *paradiseidæ*—the red bird of paradise, I think, which is almost as handsome, but of this I cannot be sure. "The two hens," says Mr. Chalmers, who was travelling in New Guinea, "were sitting quietly on a branch, and the four cocks, dressed in their very best, their ruffs of green and yellow standing out, giving them a handsome appearance about the head and neck, their flowing plumes so arranged that every feather seemed combed out, and the long wires (some curious shaftless

feathers characteristic of this family of birds) stretched well out behind, were dancing in a circle round them. It was an interesting sight. First one and then another would advance a little nearer to a hen, and she, coquette-like, would retire a little, pretending not to care for any advances. A shot was fired, contrary to our expressed wish; there was a strange commotion, and two of the cocks flew away, but the others and the hens remained. Soon the two returned, and again the dance began and continued long. As we had strictly forbidden any more shooting, all fear was gone: and so, after a rest, the males came a little nearer to the dark brown hens. Quarrelling ensued, and in the end, all six birds flew away."

There is not, it must be confessed, much power of description shown here, but it is from life, and at any rate the birds are not killed—a very redeeming point indeed.

## CHAPTER VI

BIZCACHAS AND BIZCACHERAS—INTERESTED NEIGHBOURS—A PROVIDENT MOTHER—PRAIRIE-DOGS AND RATTLESNAKES—OWLS THAT LIVE IN BURROWS.

THAT strange habit which the bower-birds have of bringing all sorts of things—such as bleached bones, shells, etc.—to the places they make, is practised also by at least one species of mammal—the Bizcacha or Vizcacha, namely, an animal whose home *par excellence* is the pampas of South America, where it takes the place of the allied prairie-dog, or marmot, of the northern continent. It is a quaint-looking animal, something like a rabbit, Darwin thought, but with larger gnawing teeth, and a much longer tail. Like the rabbit, too, it is social in its habits, and makes a burrow of huge size, with a mound piled up all around it. It is to this mound that the bizcacha brings almost everything that it finds lying about, which is not too large for it to drag or carry, and just as in Australia one looks for anything one has lost in the habitations of the bower-birds, so on the pampas the first thing to do is to search the neighbouring bizcacheras —to use the Spanish word for a settlement or colony of these animals.

Thus, if a Spanish gentleman should happen to drop his watch whilst riding, or a herdsman his whip, he is not much put out about it, even if it happened on a dark night. Next morning he rides again along the track of his horse's hoofs, and comes back with the watch in his pocket or the whip in his hand.

Nobody knows why the bizcacha does this, or, to talk in a more scientific way, what is the origin of the habit. There can be no doubt whatever that the flowers or shells brought to the gardens or play-houses of the bower-birds answer the purpose of decoration, and are thought pretty by the birds. The bizcacha may have the same idea, but if so it seems funny that no other member of his family, and, indeed, as far as I am aware, no other mammal at all, should act similarly, or seem attracted by objects in themselves, independently of any use they can be put to. Nor does the bizcacha play with these things—at least I have not heard of his being seen to do so. He just pulls them to his mound and then seems to pay no further attention to them. Another explanation has been suggested* which I think is more likely to be the real one. The bizcacha is extremely careful in clearing the ground, not only round its own burrow, but all about the village, as a collection of bizcacha burrows may be called. This he can only do by removing all objects, whether growing or merely lying about, but it is his instinct instead of dragging them away from the village into the country at large, to drag them to his mound and get rid of them

* By Mr. Hudson in *The Naturalist in La Plata.*

there. Perhaps if he were to carry them off he would not know when to stop. The mound gives him a definite place to bring them to, and, moreover, he feels safer going towards his burrow than away from it. However, whatever may be his reason, this is what the bizcacha does. He is an animal that makes a mound or hill of earth, and then brings everything he can find to that mound, and lays it on the top of it.

Though the bizcacha is not so very much bigger than a rabbit yet he makes a very much bigger burrow to live in, and the entrance to it especially is enormous, being five or six feet across, and deep in proportion, so that if a man were to jump into one he would lie hidden up to the waist. It is from the earth that is dug out of this great pit that the mound is made, and as bizcachas make their burrows very close together, the mound round one becomes part of that round another, so that at last there comes to be one great mound like a low hillock, with several large pits all over it, and this is the bizcachera, or village of the bizcachas—the bizcacha warren as we should call it. But though it is their village and they have made it, it is not only the bizcachas who live in it. Quite a colony of birds and animals dwell there, some of them not at all for the good of the rightful owners. Chief amongst the latter are the fox and the weasel of the pampas. The fox—a beautiful, grey animal, something like a dog in appearance—comes to the village, and having driven a pair of the poor bizcachas out of their burrows, takes up his abode in it himself. That, at present, is all the harm he

does, for the young bizcachas are not yet big enough to come out of their burrows, and, beyond this first act of spoliation, he does not interfere with the old ones. But, by and by, the young bizcachas, who have grown to be nice plump little things, begin to leave their burrows and play about on the mound, and then day by day—or rather night by night—the fox pounces upon them and eats them. If the fox itself is a mother with a family of cubs to feed, the havoc she does in the bizcachera is tremendous. The poor little village children are chased from one hole to another, and killed, often in their very own nurseries, in spite of the efforts of their parents to defend them—for a pair of grown bizcachas are no match for a single fox. At length, when all the fat little succulent things—the "*marmots d'enfants*," as we may call them —have been eaten off, and only the bereaved parents—who are tough—remain, the fox—a good mother—collects her own young ones about her, and leads them to the next village, which she hopes will be better supplied.

The weasel, probably, behaves in much the same way as the fox, but whether a pretty little burrowing owl that makes the bizcachera his home—though he generally makes his own burrow—does any harm to the young ones, I cannot, for certain, say. I should think, however, that, as he is quite a small bird, such a meal would be beyond his strength, even though it might accord with his inclinations. A pair of these little owls are often to be seen sitting together, just at the entrance of one of the bizcacha burrows, and when the bizcacha comes out he

may sit beside them, for a time, looking quite friendly, and as though he had come to have a chat. One might fancy that tea would be brought up soon by a servant. This, however, is mere imagination. In reality the two species are quite indifferent to one another, as is often the case with different animals that yet live together. Besides the owls, a lively, pretty little bird, called by the Spaniards the minera, makes holes in the sides of the pit, which forms the entrance to the bizcacha's burrow, and a little swallow uses these holes for itself, and lays its eggs in them, when the mineras have flown away. It is like a miniature sandpit, with owls and mineras as well as sand-martins living in it, and it would all be very comfortable and harmonious if it were not for the fox and the weasel. The comfort is that it is not every bizcachera that has a fox for its landlord. Absentee landlordism is appreciated on the pampas. Most wonderful of all, as it seems, all sorts of insects live in these bizcacha villages, that are hardly seen anywhere else. Thus quite a little zoetrope of varied life revolves about the habitation that one animal has made for itself.

It is much the same with the little prairie-dog, or marmot, that lives, as its name implies, on the prairies of North America. This little creature is a burrower, too, and, like the bizcacha, it throws up a mound of earth outside the burrow, on which it sits up on its hind legs and surveys the country, just as if it were a man. The mound, however, is a more ordinary one than that made by the bizcacha, and although the burrows are dug pretty

close to each other, each one of them seems to have its separate mound. A great number of these—and the prairies are sometimes studded with them as far as the eye can reach—constitutes what is called a "dog-town" or "village"; and a very interesting thing it is to come upon such a town, with its tens or even hundreds of thousands of inhabitants, a large proportion of whom are always to be seen sitting up on their dome-like mounds, like sentinels posted all about, to prevent the city being taken by surprise.

Here, too, the city has an alien population. There are burrowing owls, and probably foxes too, but the most remarkable animal that takes up its abode in the burrows of the prairie-dog, or marmot, is the dreaded and terrible rattlesnake. As in the case of the fox with the bizcacha, the possession, here taken, is forcible, or, at least, we may assume that the poor little marmot would resist it if it could. It would appear, however, that the legitimate owners are not expelled by the rattlesnake, but with their family continue to live in the same burrow—as long, that is to say, as the family lasts, for of the relations subsisting between it and the reptile there is now no doubt. "It was generally thought," says the Rev. J. G. Wood, "on the discovery of owls and rattlesnakes within the burrows of the prairie-dogs, that these incongruous beings associated together in perfect harmony, forming, in fact, a 'Happy Family' below the surface of the ground. The ruthless scalpel of the naturalist, however, effectually dissipated all such romantic notions, and proved that the

snake was by no means a welcome guest but an intruder on the premises, self-billeted on the inmates, like soldiers on obnoxious householders, procuring lodging without permission, and eating the inhabitants by way of board. The reason for the presence of the owls is not so evident, though it is not impossible that they may also snap up an occasional prairie-dog in its earliest infancy, while it is still very young, small, and tender." At this period, however, the young would, no doubt, be vigilantly guarded by the mother, and as the owl is quite a little bird, it would not be likely to attack them under these circumstances. Moreover, the existence of countless burrows, all ready-made, is quite sufficient to explain the owl's presence in any of them, since it is not driven out by the owner. In an illustration of the work from which the foregoing passage is quoted, the owl is further represented as itself having young ones, which it is defending from the rattlesnake. Whether it really breeds in the burrows I do not know, but with its habits I can see no reason why it should not. For the rattlesnake, too, the burrows must make splendid places of retirement, so that even if it were a question of lodging only, and not board, I can see nothing strange in its going into them. I believe myself, indeed, that this is the principal good sought, and the other only incidental to it. Wood writes as if it was quite an unheard of thing for two or more animals of different species to live together, without hurting one another; but this—as no one knew better than himself—is not the case, as we may see with the shark and pilot-

fish, or in an ants' nest, or in the bizcacheras that we have just been speaking about—for what harm do the swallows or mineras do to each other or the bizcachas? There was really nothing so very romantic—if by that is meant silly—in the idea of the "Happy Family." Ordinary people were not so much at fault, nor were naturalists so very superior.

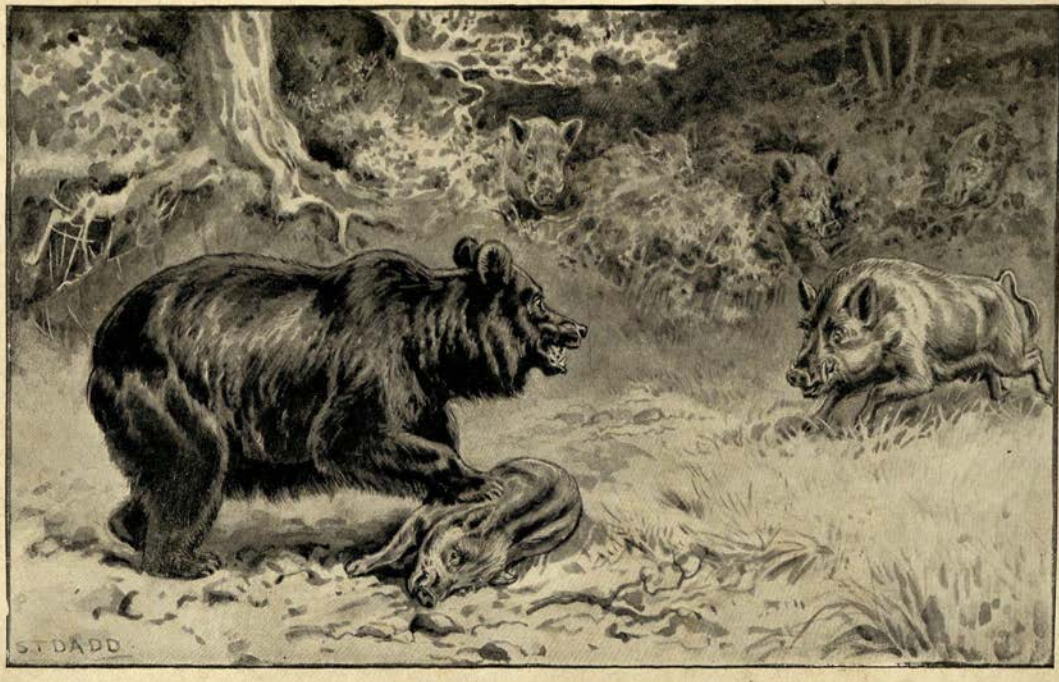
## CHAPTER VII

THE PUMA AND THE JAGUAR—TWO FIERCE ENEMIES—A STRANGE ATTACHMENT—A NIGHT ON THE PAMPAS—THE STORY OF MALDONADA.

BUT the greatest enemy that either the prairie-dog or the bizcacha has to contend with, is not the fox or the rattlesnake, but the dreaded puma or cougar, next to the jaguar the largest and most formidable animal of the cat tribe that lives on the American continent. It seems strange that a creature which kills horses and cows, as well as the wild huanaco, the tapir, deer, and American ostrich, should think of anything so small as a bizcacha or prairie-dog, but the puma will kill not only these, but even small birds, and the burrowing armadillo if he happens to come across it. More curious still, the dreaded jaguar, which one might have thought secure from every enemy except man, is attacked and vanquished by the puma. I have not heard of its being killed by him, indeed, nor should I think that possible, since if the two came to a grapple the jaguar would certainly be the stronger. What the puma does is to leap on the jaguar's back, claw him savagely, and then spring off again, before the tormented beast has had

time to do anything—for the puma is ever so much quicker and more active, though not so strong as the jaguar.

Why the puma should act thus I cannot tell, but both the Indians and the half-breed Gauchos of the pampas tell the same story, and as jaguars are often killed that have their backs all over claw-marks, I suppose it must be true—unless they have done it to one another. This does, indeed, seem possible, and if it were only the male jaguars that were found with their backs in this state I should look upon it as the explanation. But there is no distinction of this sort, as far as I know, so I think it must be pumas, for a male jaguar would not fight with a female one, nor would the females be likely to fight together. The curious thing is that in that part of America where there are no jaguars, but where the grizzly bear is found, the puma is said to attack this huge and powerful beast—so that we have the same kind of story told by quite different people, separated from each other by an immense tract of country. Just as with the jaguar, the puma is supposed always to come off victorious in his encounters with the grizzly, and it is even said that the latter is sometimes killed by him. I must confess, however, that I find this very difficult to believe. The puma is immensely agile, and, like others of the cat tribe, very muscular in proportion to its size. But a full-grown grizzly bear is twice as large and twice as heavy as itself, and its strength must be in proportion. How, then, does the slight-built puma overpower and kill so ponderous an animal, clad in a shaggy coat of fur? Once seized by the




A Bear Beset by Wild Swine.

A wild pig, which had been seized by a bear, rescued by its comrades.

grizzly I think it would have no chance, but it is possible, perhaps, that by springing on its back and wrenching its head suddenly round, it might be able to dislocate the neck, as it does that of a horse. That, indeed, is the puma's usual method of attack, and we must remember that, strength for strength, a horse of any size is almost as much its superior as the grizzly bear itself. So perhaps, after all, the thing is not quite so unlikely as it, at first sight, appears. The wonderful thing is that the puma should attack such animals as bears and jaguars, instead of confining itself to the more timid and peaceable creatures of the browsing kind, as do most beasts of prey.

But if this be wonderful, what are we to say of another trait or quality, in which this strange creature seems to stand alone amongst wild animals. It almost reads like a fable, but it really does seem to be true that the puma, fierce as he is, has yet a strange affection for mankind, and that not only will he not attack a man himself, but will even prevent other animals from doing so. There is a story told by the Gauchos of a man who, whilst hunting on the pampas, had his leg broken by a fall from his horse, and was left out all night. During the whole time he was guarded, as it seemed, by a puma, who, when a jaguar drew near to attack him, as he thought, sprang upon it, and prevented it from doing so. All through the night the puma and jaguar fought about the man, sometimes so near that he could see their shadowy forms through the darkness, whilst at other times their presence and actions were betrayed only by the fierce sounds which

issued from them. These, on the part of the jaguar, consisted of growls and roars, but the puma has a peculiar yelling cry which, in itself, is still more terrible, and comes full of fear to all who do not know its habits. For this dreadful sound the Gaucho kept listening, and when it rang out, loud and shrill, he hailed it as an assurance that the puma was victorious, or, at least, holding its own, and took courage accordingly. But when it sank, or seemed choked and muffled, then his heart sank with it, and nervously grasping his long, curved knife—the only weapon that remained to him—he sat each moment expecting the jaguar's spring, till once more that thrilling cry—raised as in triumph—cheered his spirits, filling him with hope. The sweetest music—from his wife's or children's lips perhaps—had never fallen so sweetly on his ears as did that savage sound. So much, in this world, are we the creatures of circumstance, and so much are things what they mean for us! This dreadful alternation of hope and fear, or rather of fear relieved by hope, or weighted with despair, continued till the dawn of morning, when both the beasts disappeared, the combat apparently having had no decisive issue. The man was confident that he owed his life to the puma, which, as he further related, had appeared first upon the scene, and sat for some time near him, though without appearing to notice him. It was not till after midnight that he first saw the jaguar, which was crouching only a little way off, but with its head turned in the opposite direction. Doubtless it was watching the puma, for shortly afterwards, when it had crawled farther off and had become

invisible, the dreadful sounds of strife rose suddenly out of the darkness of the night.

There can be little doubt, I think, that the jaguar would have seized and devoured the Gaucho had it not been for the puma; but it does not, therefore, follow that the puma, knowingly and of set purpose, protected the man. As its enemy, he would have been likely to attack the jaguar in any case, and if we suppose the latter to have kept all night near the man, because it wished to attack him, this would account for the fighting having been always near him, too, instead of the scene of it having gradually shifted; for the puma would have stayed where the jaguar was, in order to fight with it. We have, of course, only the Gaucho's word for the truth of his story; but I think myself that if he had been romancing he would have made up a very different one, containing much more varied incidents, wherein he himself would have played a much more considerable part. It looks to me like a true tale, but, as I say, it does not quite prove that the puma stayed by the man all night, in order to take care of him. His strange love of man might have brought him there at first, and then all the rest would have followed as it did. That for some reason or other, perhaps to do with his scent—we must remember how fond cats are of valerian—the puma really does like man, and becomes quite mild in his presence, can hardly,* I think, be doubted. All the Gauchos and all the Indians —the two races of men that come most in contact with the animal—assert that such is the case, and the very

* In South America at least.

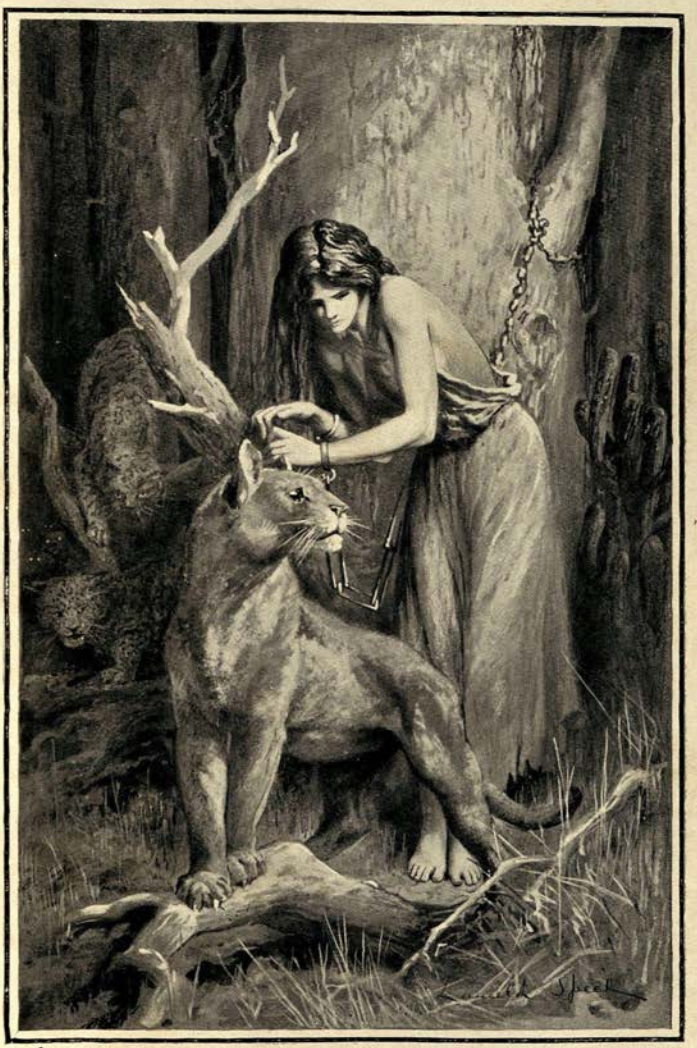
name which the Gauchos give to the puma is "El amigo del hombre" ("the friend of man"). They say that not only will it never attack man, but that, if attacked by him, it will allow itself to be slaughtered without making any resistance. Why should they assert things so unlikely in themselves, and which are in such contrast with the known character of the puma where other animals are concerned, and especially in regard to the jaguar, if they were not the actual truth? The Spaniards, when they first came to America, were not prepared for anything of the sort, and if they had wished to invent they would have been much more likely to have invented tales of the puma's fierceness, and of their own skill and courage in hunting it. Perhaps they did at first, but gradually the truth became manifest, so that such stories no longer "went down," as we say. Instances of the puma's strange attachment to mankind became more and more numerous, until at last the matter ceased even to excite their wonder, as the strangest things do when once they have become familiar. Now, in South America at least, the fact is notorious, and notoriety, here as elsewhere, ought, I think, to be accepted as proof. Moreover, nobody has the slightest fear of the puma. There is no record of men having been seized by it, as they often are, or, at least, as they often used to be, by the jaguar, and even if a little girl or boy happens to be out on a dark night, nobody is alarmed, if only pumas are supposed to be about. When the Gaucho we have been reading about told his strange story, nobody disbelieved him, or even thought it was anything very remarkable. If, however, it

had been told in early colonial days, before the Spaniards had left a race of half-breed descendants, whose life is always bringing them into contact with wild animals, and who are familiar with all their ways, in that case it would either have been discredited or else put down to a miracle. Whether the story of Maldonada, as told by the old Spanish chronicler, Rui Diaz de Guzman, is true or false, and whether, if true, it is in the nature of a miracle or not, I will let my readers decide: but here it is.

In the early days of the Spanish conquest, Buenos Ayres, which is now a large and beautiful city, the capital of the Argentine Republic, was only a small town, with a fort and some soldiers to guard it, and in the year 1536 it was besieged by the Indians, so that, the provisions being exhausted, a terrible famine set in. Eighteen hundred people died of starvation, and the putrefying smell of their bodies, which were disposed of hastily in shallow trenches, only just outside the town, caused beasts to assemble from the surrounding country, so that the risk of being devoured by them was added to that of death at the hands of the Indians, for any who might venture beyond the palisades. Still, as the allowance of flour on which the survivors were living had shrunk to six ounces a day, whilst the flour itself had become almost putrid, there were many who were content to run both these risks for the chance of finding anything, either living or dead, which hunger might enable them to eat, in the woods surrounding the town. Amongst these was a young and beautiful woman named Maldonada, who, losing her way, and wandering amongst the woods, was at last taken by

the Indians, and received by them into their tribe. A few months afterwards, however, the governor of the town, a man named Ruiz, succeeded in ransoming her, and she was brought back.

Little good, however, was intended to Maldonada by this act. Upon her arrival Ruiz accused her of having wished to betray the town to the Indians, and, in expiation of this imaginary crime, ordered her to be taken again to the forest, tied to a tree, and left either to starve, or be devoured by any ravenous beast that might see her. The cruel command was punctually obeyed, and Maldonada, bound and helpless, was left to her terrible fate. At the end of two days, the Governor, wishing to have his ears gratified with an assurance of her death, sent a body of soldiers to seek for her remains. They found Maldonada herself, alive and uninjured, and the story she told was the same as that of the Gaucho left helpless, all night, on the pampas. An enormous puma, she said, had appeared soon after sunset, on the day that she had been left to die, and during the whole of that night and the following one, had guarded her against the assaults of numberless savage beasts that had raged around. God, she thought, had sent the puma to protect her, knowing her innocence; and this was the view that the soldiers, sent to find her, took too, as did also the townspeople, and, at last, the Governor, Ruiz, himself. Maldonada, on being taken back, was proclaimed innocent, and the war with the Indians being shortly brought to a close, she lived the rest of her life in happiness and prosperity. Whether she thought kindly of pumas ever



A GALLANT WILD ANIMAL.

For two whole nights an enormous puma defended the girl from the attacks of countless wild beasts.

afterwards, and always wore a mantle made of their skins in recognition of the service one had done her, I do not know; but were this recorded of her, I should see no reason to doubt the truth of the statement. The old chronicler who tells the story says that he knew Maldonada; but, instead of telling us anything more about her, he contents himself with making an obvious, poor pun upon her name. From this we may, perhaps, infer that, except when helped by a puma, she was not a very interesting person.

## CHAPTER VIII

BEES AND ANTS—A ROBBER MOTH—ANTS THAT KEEP COWS AND SLAVES—ANTS THAT ARE HONEY-POTS—ANTS THAT SOW AND REAP.

THE most wonderful of all insects—that, at least, would be the general opinion—are bees and ants. As bees are so very well known, and kept by so many people, I will not say much about them here, which will leave more space for the ants. Of the two, bees perhaps are the finer architects, for nothing quite so wonderful as their rows of hexagonal cells is to be found in an ant's-nest. "He must be a dull man," says Darwin, "who can examine the exquisite structure of a comb, so beautifully adapted to its end, without enthusiastic admiration"; and he goes on to observe that "bees have practically solved a recondite problem, and have made their cells of the proper shape to hold the greatest possible amount of honey, with the least possible consumption of precious wax in their construction." No doubt these wonderful cells are now made instinctively, yet the bees can adapt their architecture to special circumstances, which shows the possession of reasoning power. Thus, should a piece of the comb fall down, they will not only fix it, by wax, in its new position, but,

what is much more extraordinary, will strengthen the attachments of the other combs, lest they should fall too —for there can be no other reason for such an act. Bees, again, are sometimes much annoyed by the death's-head moth which enters the hive at night, and devours the honey, apparently without danger to itself, though why this should be the case we do not know. After having suffered for some time, however, the bees barricade the entrance by building behind it a wall of wax and propolis, through which they make a hole large enough to admit themselves, but which quite excludes the bulky body of the moth. Here, too, we have reason and foresight in a high degree, as much, I think—perhaps more so—as has ever been observed in any occasional act of an ant, devised to meet special circumstances. For it is only in years in which the death's-head moth is specially abundant that the bees act in this way; and, moreover, when it seems no longer required, they remove the barrier they have made.

The puzzling thing is that acts like this seem to show higher intelligence than, to judge by various experiments, one would think either ants or bees possessed. The results, for instance, of the experiments made by Lord Avebury in this direction, are rather disappointing than otherwise, especially with ants, creatures so far advanced in civilisation, as we may call it, and the ways of man, that they keep both cows and slaves, milking the one and making the others work for them. The cows are represented by little insects called aphides, one species of which we are accustomed to see upon our rose trees, and

the milk is a drop of nectar which they exude from the abdomen, upon the ants gently tapping them there with their antennæ. Various kinds of ants milk various kinds of aphides, and some keep them in their nests, where, indeed, they are born, their eggs being tended with the same care as those of the ants themselves. Thus we see amongst ants a creature kept and used regularly for a certain purpose, as domestic animals are amongst ourselves, and this, as far as we know, is unique in the animal world. The aphides, too, belong to a family of insects quite distinct from the Hymenoptera, amongst which the ants are included.

Ant-slaves, on the other hand, are ants themselves, though belonging to another species than their masters. The latter raid their nests and carry off, without injury, the larvæ and pupæ, which they afterwards hatch out in their own. These ants, therefore, are born into slavery, so that they do not know their condition, if we could suppose that that would disquiet them, and, moreover, they are not ill-used, but treated in every respect as well as though they belonged to the community in which they have been born. The only thing that makes them slaves is that they work for the ants by whom they have been captured, but this they do *con amore*—ants love working—so that there is no hardship in it. They work, however, in varying degrees, some species of slave-making ants being accustomed to do a certain amount for themselves, whilst others even require to be fed, and are often carried by their slaves, who, of course, do all the regular household business of building, feeding the young, bring-

ing food to the nest, etc., etc. When Huber—the great French observer of ants and bees—placed thirty of this latter kind of slave-making ants in a box, with some of their larvæ and pupæ and a supply of honey, but without any slaves, "more than one half of them died of hunger in less than two days." The others were languid and without strength, and appeared able to do nothing. Commiserating their condition, Huber at length gave them a slave. "This individual, unassisted, established order, formed a chamber in the earth, gathered together the larvæ, extricated several young ants that were ready to quit the condition of pupæ, and preserved the life of the remaining Amazons," as Huber calls these slave-raiders, in allusion to their sex. It is only the worker ants of any species who are taken away by others, whilst still immature, to be afterwards hatched out as slaves, for they alone would be of use. Both ants and bees, as is well known, are divided into three different sets or castes, the males, the perfect females, who become queens and are the founders of the community, and the immature females or workers, who are the most interesting of the three, and by whom the whole work of the hive or nest is carried on.

One of the most extraordinary of all ants—and therefore of all insects—is the honey-ant of Mexico (with some adjoining regions) and Australia. Amongst these, a certain section of the community take the place of aphidæ amongst other ants. They live but to distribute honey to the rest, and by reason of this, and the remarkable way in which their purpose is accomplished, may be

said to be living honey-pots. In the first place, they are themselves fed with honey by the workers, who swallow it and bring it up from their stomachs in the way in which a pigeon brings up food for its young—a process which is called "regurgitation." During this process the abdomen of the honey-bearers begins to swell, and by degrees becomes quite globular, and of such a disproportionate size to the rest of the body that the latter projects from it like a piece of stick, and is raised high above the ground. When thus fully distended it is difficult for the insect to walk—a feat which it can only accomplish sideways—but it has, as a rule, no necessity to do so, and only clings motionless to the vaulted roof of the cell or chamber in which it is enclosed. This is of a roughly circular shape, about three inches across, and an inch or three-quarters of an inch in height. It is called the honey-chamber, and in it a number of these honey-bearers reside—if they may not rather be said to be stored—hanging closely together, and looking like a bunch of currants or small amber-coloured grapes—for their abdomens are transparent, so that the honey shows through them. It used to be thought that these ants had no stomachs, so that the abdomen itself made the jar for the honey. This, however, is a mistake. The honey on being swallowed, is received into the stomach, and this by swelling inordinately, causes the abdomen to swell too. It is interesting that whilst the floors of these honey-chambers are quite smooth, the roof is rough, so that the ants, fixing their feet upon the granulated surface, can cling there more securely. We need not sup-

pose, however, that the ants produce this result purposely, for it is by their constantly walking over the floors of the chambers that they become smooth and polished. Here, then, we have the honey-jars. The workers when they are hungry come to them, and lifting their mouths up to the mouth of the jars, the honey from the latter is poured —or regurgitated—into them. In doing this the honey-bearing ant—or, as she is often called, from the shape of her abdomen, the rotund—throws her head up, and a drop of clear, amber fluid is then seen to exude from her mouth, which is eagerly licked up by the workers.

It is to be presumed that the latter crawl up the walls of the honey-chambers in order to be fed by the rotunds; but I am not quite sure whether Mr. MacCook, who kept these ants, and is the authority upon them, ever actually saw them do this. On the other hand, he often saw them fed upon the ground; but then, I think, he had put the honey-bearing ants there. In his book he gives some interesting illustrations of the feeding taking place. It used to be thought that these poor honey-pot ants were unable to walk, and lived all their lives in one place. This, however, is not the case. Mr. MacCook tells us that he has "frequently seen them coming out of their chambers, ascending the galleries, and moving freely about them." They went sideways, and half slid and half crawled along. Again, when he placed them on a table, they were able to move "with no little agility." If, however, they happened to fall from the roof where they were clinging, which sometimes they did through people shaking them, they were not able to get up again,

but lay there helpless. It is not always, however, that these honey-jars are full, and when they are half or three-quarters empty they can walk very much better.

Some ants, it is now well known, are accustomed to store up grain in their nests during the summer or autumn, so as to have a supply of food during the winter. Long ago this habit had been recorded by Solomon, who says, "The ants are a people not strong, yet they prepare their meat in the summer"; and again, "Go to the ant, thou sluggard; consider her ways, and be wise: which having no guide, overseer, or ruler, provideth her meat in the summer, and gathereth her food in the harvest." Classic writers have also dwelt upon this interesting point in ant economy, so that for a long time it was taken for granted not only that some ants stored grain, but that all of them did. However, when the European species began to be observed very carefully, this opinion was found to be erroneous, and Huber and other investigators, having convinced themselves that grain in these instances was not so stored, opinion began to go to the other extreme, and the fact was denied altogether. It was supposed that Solomon, and the ancient writers generally, had seen the ants carrying their little white larvæ or pupæ—as anyone may do who disturbs a nest—and that these had been mistaken for seeds.

For my part, I think that this is very likely to have been the case in some instances, for until lately it has not been the custom to watch insects, or indeed any animals, minutely, and it is not the business—and often not the interest—of poets to verify matters of this kind. In the

Mishna, however, which is a collection of old Jewish writings, we find a law relating to this grain stored up by the ants, and the ownership of it; and anyone who had read this might have known that the thing was a reality, since minute regulations about the possession of something can hardly exist, unless that something exists, too. This is the law, which, as will be seen, dealt fairly by everyone except by the ants—"The little caves of ants, when in the midst of a standing crop, are adjudged to the owner of the field; of those behind the reapers, the upper part is the property of the poor, the lower of the proprietor." Rabbi Meir, however, decided that "all belong to the poor, since whatever is in doubt, in gleaning, goes to the gleaner."

Yet in spite of the strong presumption in favour of ant providence and foresight, which this piece of ancient legislation raises, opinion was against it, and it was not till 1829 that the question was set at rest by Lieutenant-Colonel Sykes, who, whilst at Poonah, in India, saw and examined these "little caves of the ants" and also the ants carrying the seeds, not into but out of them. "Each ant," he tells us, "was charged with a single seed; but, as it was too weighty for many of them, and as the strongest had some difficulty in scaling the perpendicular sides of the cylindrical hole leading to the nest below, many were the falls of the weaker ants with their burdens, from near the summit to the bottom." The ants, however, that thus fell never relaxed their hold of the grain they were carrying, and, with a perseverance affording a useful lesson to humanity, "steadily recom-

menced the ascent, after each successive tumble, nor halted in their labour until they had crowned the summit and lodged their burden on the common heap." This observation was made just after the heavy rains of the Indian monsoon. The seeds had probably got wet, and the ants were bringing them up to dry in the sun.

Here then, at last, the truth of the ancient opinion as to ants storing grain was vindicated; but now came another and still more wonderful discovery. A harvesting ant—one, that is to say, that stored grain—was found to inhabit Texas, and Dr. Lincecum, who lived for twelve years in that country, came to the conclusion that this species not only stored the grain, but planted it, too, so as to have a crop of seeds next year, just as a farmer plants wheat. In an account of this ant which Dr. Lincecum sent to Darwin, who read it before the Linnean Society, he says: "The species which I have named Agricultural, is a large, brownish ant. It dwells in what may be termed paved cities, and like a thrifty, diligent, provident farmer, makes suitable and timely arrangements for the changing seasons. When it has selected a situation for its habitation, if on ordinary dry ground, it bores a hole, around which it raises the surface three and sometimes six inches, forming a low circular mound, having a very gentle inclination from the centre to the outer border, which on an average is three or four feet from the entrance. But if the location is chosen on low, flat, wet land, liable to inundation, though the ground may be perfectly dry at the time the ant sets to work, it nevertheless elevates the mound in the form of a pretty sharp cone to the height

of fifteen to twenty inches or more, and makes the entrance near the summit. Around the mound, in either case, the ant clears the ground of all obstructions, and levels and smooths the surface to the distance of three or four feet from the gate of the city, giving the space the appearance of a handsome pavement, as it really is. Within this paved area not a blade of any green thing is allowed to grow except a single species of grain-bearing grass. Having planted this crop in a circle around, and two or three feet from, the centre of the mound, the insect tends and cultivates it with constant care, cutting away all other grasses and weeds that may spring up amongst it, and all around, outside the farm-circle, to the extent of one or two feet more. The cultivated grass grows luxuriantly, and produces a heavy crop of small, white, flinty seeds, which under the microscope very closely resemble ordinary rice. When ripe it is carefully harvested and carried by the workers, chaff and all, into the granary cells, where it is divested of the chaff and packed away. The chaff is taken out and thrown beyond the limits of the paved area. During protracted wet weather," continues Dr. Lincecum, thus supporting the observations of Lieutenant-Colonel Sykes, "it sometimes happens that the provision stores become damp, and are liable to sprout and spoil. In this case, on the first fine day, the ants bring out the damp and damaged grain and expose it to the sun till it is dry, when they carry it back and pack away all the sound seeds, leaving those that had sprouted to waste."

In 1877 Mr. MacCook visited Texas on purpose to find

out whether the harvesting ants really sowed the seed, as Dr. Lincecum had reported, for of course anyone may be mistaken. He saw a good deal of what Dr. Lincecum had seen, but not all, which is no wonder, since he only stayed a few weeks, whereas Dr. Lincecum had lived in the country for twelve years. Mr. MacCook could not make up his mind upon the subject, but he saw no reason why the ants should not sow their seed, nor has he given any better explanation of their clearing a space and not letting anything but their ant-rice grow upon it. There can, I think, be very little doubt that Dr. Lincecum was right in his opinion. We need have no difficulty in believing that some ants have fields and raise crops upon it, because there are other kinds, which, though they do not do this, do other things which are quite as wonderful, and demand quite as much intelligence. Mr. Belt, too, as we shall see, in a little, believes that some ants in South America grow mushrooms and make beds to grow them on.

This is the description which Mr. MacCook gives of the way in which a harvesting-ant carries its grain of rice—as big almost and heavy as itself—to the nest. "At last a satisfactory seed is found. It is simply lifted from the ground, or, as often happens, has to be pulled out of the soil, into which it has been slightly pressed by the rain or by passing feet. Now follows a movement which at first I thought to be a testing of the seed, and which, indeed, may be partially that; but finally I concluded that it was the adjusting of the burden for safe and convenient carriage. The ant pulls at the seed-husk with its man-

dibles, turning and pinching or feeling it on all sides. If this does not satisfy, and commonly it does not, the body is raised by stiffening out the legs, the abdomen is curved underneath, and the apex applied to the seed. I suppose this to be simply a mechanical action for the better adjusting of the load. Now the worker starts homeward. It has not lost itself in the mazes of the grass-forest. It turns directly towards the road (one of the little roads made by the ants, as they come and go to and from their nest) with an unerring judgment. There are many obstacles to overcome. Pebbles, pellets of earth, bits of wood, obtruding rootlets, or bent-down spears of grass block up or hinder the way. These were scarcely noticed when the ant was empty-handed. But they are troublesome barriers now that she is burdened with a seed quite as thick, twice as wide, and half as long as herself. It is most interesting to see the skill, strength, and rapidity with which the little harvester swings her treasure over or around, or pushes it beneath these obstacles. Now the seed has caught against the herbage as the porter dodges under a too narrow opening. She backs out and tries another passage. Now the sharp points of the husk are entangled in the grass. She jerks or pulls the burden loose, and hurries on. The road is reached, and progress is comparatively easy. Holding the grain in her mandibles well above the surface, she breaks into what I may describe with sufficient accuracy as a 'trot,' and with little further interruption reaches the disk (the cleared space round the nest, that is to say) and disappears within the gate."



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The seeds, when thus brought into the nest, are stored by the ants in long galleries, or in vaulted chambers, the floors of which have been specially prepared for its reception. It is a very curious thing that the stored seeds, though they often become quite moist, do not germinate, as would be the case under ordinary circumstances, if we, for instance, were to lay them in some cave or cellar. Were they to do so they would become bitter, and, of course, unfit for food, so that it seems as if the ants must have some way of stopping the process of nature. What this way is we do not know, but if, out of a great many thousands, some of the seeds do begin to sprout, the ants bite off the little rootlet or radicle that then makes its appearance, by which act the germination is prevented from going farther. It is quite as wonderful that the ants should have found out how to prevent the seeds from growing in their nests—and do it in two ways —as it is that they should plant it in fields specially prepared for it to grow upon.

## CHAPTER IX

ANT ARMIES—A SNAKE'S PRECAUTION—WONDERFUL BRIDGES AND TUNNELS—MUSHROOM-GROWING ANTS.

WE will next consider the foraging ants of such tropical countries as Brazil and Western Equatorial Africa. To the latter the name of driver-ants has been given, because when they set out on their invading marches they drive every living thing, including man, before them. Everything they seize they devour, and as they go in great numbers and constantly open out into two or more columns so as to enclose patches of the forest, hosts of creatures find it impossible to escape destruction. Du Chaillu gives an interesting account of these ants, which were called *bashikonay* by the natives amongst whom he was living. He says: "This ant is very abundant in the whole region I have travelled over in Africa, and is the most voracious creature I ever met. It is the dread of all living animals from the leopard to the smallest insect. I do not think they build a nest or house of any kind. At any rate, they carry nothing away, but eat all their prey on the spot. It is their habit to march through the forests in a long regular line —a line about two inches broad, and often several miles in length. All along this line are larger ants, who act as

officers, stand outside the ranks, and keep this singular army in order. If they come to a place where there are no trees to shelter them from the sun, whose heat they cannot bear, they immediately build underground tunnels, through which the whole army passes in columns, to the forest beyond. These tunnels are four or five feet underground, and are used only in the heat of the day, or during a storm. When they grow hungry, the long file spreads itself through the forest in a front line, and attacks and devours all it overtakes with a fury which is quite irresistible. The elephant and gorilla fly before this attack. The black men run for their lives. Every animal that lives in their line of march is chased. They seem to understand, and act upon, the tactics of Napoleon, and concentrate, with great speed, their heaviest forces upon the point of attack. In an incredibly short space of time the mouse, or dog, or leopard, or deer is overwhelmed, killed, eaten, and the bare skeleton only remains."

These terrible insects travel night and day. "Many a time," says Du Chaillu, "have I been awakened out of a sleep and obliged to rush from the hut and into the water, to save my life, and after all, suffered intolerable agony from the bites of the advance-guard, who had got into my clothes. When they enter a house they clear it of all living things. Cockroaches are devoured in an instant. Rats and mice spring round the room in vain. An overwhelming force of ants kills a strong rat in less than a minute, in spite of the most frantic struggles, and in less than another minute its bones are stripped. Every living thing in the house is devoured. When on their

march the insect-world flies before them, and I have often had the approach of a bashikonay army heralded to me by this means. Wherever they go they make a clean sweep, even ascending to the tops of the highest trees in pursuit of their prey. Their manner of attack is an impetuous leap. Instantly the strong pincers are fastened and they only let go when the piece gives way. At such times this little animal seems animated by a kind of fury which causes it to disregard entirely its own safety, and to seek only the conquest of its prey. The bite is very painful." This latter statement it is easy to believe from the figure given in Du Chaillu's book of one of these driver, or bashikonay ants. It is drawn twice the size of the real insect, but, even so, this would make the latter at least as large as a wasp. The head is enormous, larger than the thorax and abdomen—which make the body—together, and from it a huge pair of curved and pointed mandibles project and cross each other at the tips. When fairly covered with such creatures the effect would be that of thousands of tiny pincers, all tearing out pieces of flesh at the same time. No wonder that the negroes who are naked, or nearly so, run for their lives. In old times, Du Chaillu tells us, native criminals used to be tied down in the path of these terrible ants, to be torn to pieces and devoured by them—a shocking piece of cruelty which one is glad to know even then (more than forty years ago) and amongst savages, was a thing of the past. This terrible fate, however, must sometimes overtake those who are too old or ailing to escape by their own efforts, and to assist whom there is no time, and possibly but little inclination.

But in spite of such catastrophes, and of the danger and inconvenience which these driver-ants cause to the negroes, they are yet, in reality, very useful to them, since, several times a year, their huts are freed from the vermin with which they at all times abound.

If the gorilla and elephant fly before these ants, one can understand that snakes, however large, would also be afraid of them; and accordingly we have a curious story told by the natives, of the anxiety felt by the great python lest he should be overtaken by their armies, whilst lying torpid after a meal, and of the means which he takes to avoid such a catastrophe. Having killed his prey by crushing it in the great folds of his body, he leaves it lying on the ground, and does not return until, having made a circle of a mile or more in diameter, about the body, he is assured that no ant-army is on the march. Only then does he dare to swallow his prey and risk the dangerous period of sluggish inactivity which is necessitated by the process of digestion. If, however, the object of fear should be met with the python glides off with all possible speed, leaving the booty to be devoured by the ants should they happen to come upon it.

The habit of these driver-ants of making a tunnel as they march along, and thus sheltering themselves from the heat of the sun, is very remarkable, but I cannot quite understand how they drive it so deep under the ground as Du Chaillu says. To do so must surely delay them for a very long time, and the quicker and more expedient course would seem to be to wait for the sun to go down, and then to cross the open space. However, we should

never assume, in natural history, that a certain course will be pursued by any animal, simply because it is the best one. Often, however obvious this seems, they act otherwise. From other accounts, however, it would seem as if the ants threw up their tunnel on the surface of the ground instead of excavating beneath it, and that, sometimes, the structure reared by them is more of the nature of an awning than a tunnel. The Rev. Dr. Savage, for instance, says: "If they should be detained abroad till late in the morning of a sunny day, by the quantity of their prey, they will construct arches over their path, of dirt agglutinated by a fluid excreted from their mouth. If their way should run under thick grass, sticks, etc., affording sufficient shelter, the arch is dispensed with; if not, so much dirt is added as is necessary to eke out the arch, in connexion with them."

Sometimes a still more wonderful arch or tunnel is made by the ants, for it is a living one composed of the bodies of some of their number. These, apparently, stand in two rows upon their hinder legs, and by interlocking their jaws and intertwining their anterior legs and antennæ make a covered way for the workers to pass along. From this, it would appear that certain of the ants feel the heat less than the ordinary workers. Apparently, however, the ants only act in this way when the sky is clouded, and when, as a consequence, one would not have expected any covering to be necessary. Dr. Savage, who gives this interesting account of ant body-building, as one may call it, has not been sufficiently

explicit in regard to the details and circumstances attending it.

More extraordinary even than their habit of making a living arch or gallery, is the method which these ants employ of passing rivers. To do this they climb a tree upon one or other of its banks, and running out along a branch overhanging the water, let themselves down by clinging one to another, until a rope is formed of their united bodies. This soon reaches the water, and becoming constantly longer as fresh ants run down and affix themselves, is swept out from the shore by the force of the current, until at length its free end is washed against the opposite bank. There is, now, a thin bridge of ants, like a ribbon and of immense length, stretched slantingwise from shore to shore, and over it the main body of the ants ceaselessly pass, till there are no more to come. Only the bridge itself now remains, but the ants helping to form this, on the nearer side of the stream, detach themselves now from the tree, when the bridge changes to a rope in the water, and this, being carried at once down the stream, is soon washed against the further bank, to which its corresponding end is attached.* As soon as this has been accomplished, the living ants composing this organic work of engineering skill, crawl on shore and continue their march, bringing up the rear of the column. It has been asserted, I know—for I have read it somewhere, and well remember the accompanying illustration —that the monkeys inhabiting the Brazilian forests are

* This last, I should say, is as I imagine. Nobody tells one how the bridge itself gets over.

accustomed to cross the smaller rivers that flow through them, in the same way. As the ants do so, there seems nothing absolutely impossible in the thing, but as years have gone by and I have met with no reference to so interesting a fact in any work of standing, I have got to distrust the only authority I can remember for it—a boy's book, namely, by Mayne Reid.

Du Chaillu, whose account of the driver-ants, or bashi-konays, I have already quoted, describes their manner of bridging streams in a slightly different way, which, if correct, makes it still more remarkable. He says: "When, on their line of march, they require to cross a narrow stream, they throw themselves across, and form a tunnel—a living tunnel—connecting two trees or high bushes on opposite sides of the little stream, whenever they can find such, to facilitate the operation. This is done with great speed, and is effected by a great number of ants, each of which clings with its fore claws to its next neighbour's body or hind claws. Thus they form a high, safe tubular bridge, *through* which the whole vast regiment marches in regular order. If disturbed, or if the arch is broken by the violence of some animal, they instantly attack the offender with the greatest animosity." This presents the matter in a still more interesting light, and as it is the account of a man who professes to have seen what he describes, it should rank, perhaps, before the other, which, though I have taken it from a trustworthy source, was not there given as a first-hand account. Both versions, however, may be correct.

If streams are not sufficient to daunt the driver-ant,

neither are floods. When these occur, numbers of them rush together and cling to one another, forming a ball-shaped mass, that, being lighter than the water, floats upon it, till such time as the flood has retired. The size of these balls is, for the most part, that of an orange, but they may be either larger or smaller—tangerine orange-balls in the latter case. The natives say that the larger and stronger ants form the outer circumference of the globe, whilst the weakly ones—or, as they express it, the women and children—are contained and guarded in the centre.

I have never seen the real driver-ants, not having been in any really tropical country. In South Africa, however, I have often seen the armies, or, as the Kaffirs call them, *impis*, of a black, stinging ant, that seems to take their place. When these insects are disturbed in their march, the whole column makes a hissing noise, which can be very distinctly heard. How the sound is produced I do not know, but it is more like a hiss than anything else, and is accompanied, if I remember rightly, with a strong smell of formic acid. Though these black ants are fierce and bold, so that the Kaffirs admire them, call them warriors, and compare them with themselves, their marches are not attended with the striking sights which belong to those of the drivers, nor have they the wonderful habits or instincts of the latter. They are less than half their size, moreover, and their chief weapon being a sting, the mandibles are not extraordinarily developed. I never myself happened to be stung by one, but have heard others complain bitterly.

# FORAGING ANTS

The driver-ants of Africa are represented in tropical America by the *Ecitons*—a family containing numerous species—of which we have some interesting accounts by travellers who were, at the same time, naturalists. Speaking of the *Eciton drepanophora*, Mr. Bates, in his well-known *Naturalist on the River Amazon*, says: "When the pedestrian falls in with a train of these ants, the first signal given him is a twittering and restless movement of small flocks of plain-coloured birds (ant-thrushes) in the jungle. If this be disregarded until he advances a few steps farther, he is sure to fall into trouble, and find himself suddenly attacked by numbers of the ferocious little creatures. They swarm up his legs with incredible rapidity, each one driving his pincer-like jaws into his skin, and, with the purchase thus obtained, doubling in its tail and stinging with all its might. There is no course left but to run for it." However, it is almost as easy to "fly from oneself" (a hard thing, Horace tells us) as from ants that have once crawled up beneath one's garments and embedded their jaws in one's flesh. Only after a halt, and special attention paid to each individual, are these to be got rid of, and then only by degrees, since these determined little warriors—all undecorated, and without even a thought of crosses or promotions—are content to let their bodies be torn from their heads, as long as they can leave the latter, with the jaws attached, sticking in the wounds they have made.

"The errand," continues Mr. Bates, "of the vast ant armies is plunder, and wherever they move the whole animal world is set in commotion, and every creature

tries to get out of their way. But it is, especially, the various tribes of wingless insects that have cause for fear, such as heavy-bodied spiders, ants of other species, maggots, caterpillars, larvæ of cockroaches, and so forth, all of which live under fallen leaves or in decaying wood." Unlike the bashikonay ants that we have been considering, these Ecitons do not ascend trees to any great height, so that young birds in their nests for the most part escape. Both species consist, like other ant communities, of males, females, and workers, but the differentiation of the latter into two castes, differing both in size and shape from one another, is most marked amongst the Ecitons. The members composing these two classes are known as the worker-majors and worker-minors respectively, and whilst the latter make up the majority of the host, and thus present the standard size and appearance, the former are much larger, with heads disproportionately big, and greatly lengthened jaws.

Both the African and American kinds hunt with method and system, and each species has its own particular way of setting to work. Of that employed by the one under consideration, Mr. Bates gives us the following account. "The main column, from four to six deep, moves forward in a given direction, clearing the ground of all animal matter, dead or alive, and throwing off, here and there, a thinner column, to forage for a short time on the flanks of the main army, and re-enter it again after their task is accomplished. If some very rich place be encountered anywhere near the line of march—for example, a mass of rotten wood abounding in insect larvæ—a delay takes

place, and a very strong force of insects is concentrated upon it. The excited creatures search every cranny, and tear in pieces all the large grubs they drag to light. It is curious to see them attack wasps' nests, which are sometimes built on low shrubs. They gnaw away the papery covering, to get at the larvæ, pupæ, and newly hatched wasps, and cut everything to tatters, regardless of the infuriated owners which are flying about them. In bearing off their spoil in fragments, the pieces are apportioned to the carriers with some degree of regard to fairness of load: the dwarfs taking the smallest pieces, and the strongest fellows, with small heads, the heaviest portions. Sometimes two ants join together in carrying one piece, but the worker-majors, with their unwieldy and distorted jaws, are incapacitated from taking any part in the labour."

The precise part in the life of the community which is played by these great worker-majors, with the relation which it no doubt bears to their superior size and modified shape, has long been a puzzle to naturalists. The first idea was that they formed a soldier caste—a natural supposition in view of their great armour-plated heads, and elongated twisted jaws. Observation, however, does not bear out this theory. The jaws, in spite of their size, are not so well adapted for seizing on a plane surface —the skin, for instance, of an animal—as are those of the smaller workers; and, moreover, these large ants seemed to Mr. Bates to be less pugnacious than the others. "The position," he tells us, "of the large-headed individuals in the marching column was rather curious.

There was one of these extraordinary fellows to about a score of the smaller class; none of them carried anything in their mouths, but all trotted along empty-handed and outside the column, at pretty regular intervals from each other, like subaltern officers in a marching regiment of soldiers. I did not see them change their position, or take any notice of their small-headed comrades marching in the column, and when I disturbed the line, they did not prance forth or show fight so eagerly as the others." Mr. Bates then hazards a conjecture that these big ants may serve indirectly to preserve the community, by being indigestible to birds, and that their great, twisted mandibles may be effective, whilst lying in the crops or stomachs of the latter. This seems possible, since a certain number of unpalatable individuals in a community of ants might make birds disinclined to eat any of them. I think, myself, however, that it is premature to speculate on the part in life which these curiously modified worker ants may be designed to play, until we know something more of their home economy, and particularly of their architecture. This, it is true, is of a very rude kind, nor do these marauding ants appear to have any permanent place of abode. Still, they may do something in the shape of building, and the peculiar jaws of the worker-major class suggest that they are formed for seizing some special object, or performing some special kind of labour.

These foraging ants show a good deal of sympathy with one another, and if one is in distress the others will do their best to relieve him from his embarrassment. Mr. Belt, a naturalist who spent some time in Nicaragua,

made some experiments with a view to testing these points. He took an ant, and placed it under a stone in the line of the marching column. The first of the marching ants that saw its plight hurried back, and soon returned with several companions, to whom it had evidently communicated the intelligence. Some seized and tugged the ant, whilst others bit and pushed the stone, and, between them, the prisoner was soon freed. Other ants Mr. Belt covered up with clay, leaving only their head or antennæ projecting, and all were rescued in the same way. Lord Avebury has tried similar experiments with our own English ants, but the results were not so satisfactory. Both in sympathy and intelligence, these foraging ants of America seem much superior to the various European species. More experiments, however, with a greater number of species are much to be desired.

Another ant of tropical America is the famous *sauba* or leaf-cutting ant. All day long these insects seem occupied in cutting out pieces of leaves, and carrying them off to their nests. New arrivals in the country are astonished to meet long columns of them marching down well-beaten paths, and all carrying circular pieces of green leaf, the size of a sixpence, held upright in their jaws. All these are marching homewards, but beside them, empty-handed, another stream goes hurrying back to the forest, from which their comrades are returning laden. What use do the ants make of these leaves, after they have carried them down into their nests? In regard to this there have been various opinions. Some naturalists used to think that they used them as food simply, others that

they made a sort of underground roof to their nests with them; but Mr. Belt has almost proved that what the ants really do with their leaves, is to make them into mushroom-beds, the mushrooms—not the leaves themselves—being used as food by the community. He found, on excavating their nests, that they consisted of a number of chambers, as large, and almost as round, as a man's head. In each of these lay a brown mass of vegetable matter, which, on examination, proved to be made of the leaves themselves, now withered and cut into a number of small pieces, amidst which, and holding them all together, grew a minute white fungus—the mushrooms of the ants. Mr. Belt proved that it was not the leaves themselves which the ants ate, because he found deserted chambers filled with these, which, now that their manuring properties had become exhausted, no longer supported any fungus. Yet that the ants require food in their nests must be assumed, since they are never seen feeding outside them; and, moreover, when they desert the nest and establish themselves in another, they take the fungus-bearing leaves, but not the others, with them. Clearly, then, this fungus, which they cultivate themselves, must be their food—the ants are mushroom-growers.

Mr. Belt concludes his very interesting account of the sauba ants with one more instance of their intelligence. "A nest," he tells us, "was made near one of our tramways, and, to get to the trees, the ants had to cross the rails, over which the waggons were continually passing and repassing. Every time they came along, a number

of ants were crushed to death. They persevered in crossing, for some time, but at last set to work and tunnelled underneath each rail. One day, when the waggons were not running, I stopped up the tunnels with stones; but although great numbers carrying leaves were thus cut off from the nest, they would not cross the rails, but set to work making fresh tunnels underneath them. Apparently an order had gone forth, or a general understanding been come to, that the rails were not to be crossed."

# CHAPTER X

WHITE ANTS AND THEIR ARCHITECTURE—VERY WONDERFUL NESTS —"A PRISON AND A PALACE"—THE AARD VARK AND THE ANT-EATER—HOW ANTS ARE TRAPPED.

IN the white ants, or termites—to use their more scientific name—we have insects greatly resembling ants in their general plan and mode of life, and also much like them in general appearance, but which really are not ants at all, but belong to another order, widely distinct from them. They are Neuroptera, and thus allied to the dragon-flies, may-flies, grasshoppers, etc., whereas the real ants belong to the Hymenoptera, in which the bees and wasps are included. Like the ants, the termites are divided into males, females, and undeveloped females, or workers, which last form two castes that work in different ways, the one in building the nest, the other in defending it from attack—the former are the masons or architects, the latter the soldiers. In the matter of the nest, these white or false ants surpass all real ones, and therefore all other insects; it is built above, instead of below, the ground, and attains such a size, and rises to such a height, that these termite nests become a marked feature of any landscape, and may almost be said to turn a flat country into a hilly one. Rising in huge conical or

beehive-shaped mounds, of a red colour and with lesser mounds dotted about them, they often support a more or less dense vegetation, upon which, in South Africa, where they are the largest, antelopes, or even buffaloes, may be sometimes seen browsing. The base of such a structure may be twenty yards in circumference, the height from ten to twenty feet, or even more. The masonry composing it is a sort of red clay, and seems, to the touch, as hard and solid as brick; though that it is not really so, is shown by its yielding to the stout curved claws and muscular fore limbs of the aard vark, a creature who lives almost wholly on the termites.

Outwardly, the termite-mound is dotted with little round holes, which are the orifices of so many passages leading into the interior, whilst the interior itself presents the most wonderful arrangement of galleries, halls, nurseries, cells, and chambers that exists in the insect world. First, comes a well-aired, empty attic, situated in the crown of the dome, or, rather, the peak of the sugar-loaf, to take the more typical shape. Beneath it, with a passage between them, is a nursery where, on shelves round the walls, the young termites are hatched. Beneath this, again, is a wide hall supported by lofty pillars, and, lastly, upon the ground floor, a royal chamber, shaped like a beehive, in which the king and queen—being respectively the father and mother of the entire colony—are confined. Around this palace-prison, as it may be called, are clustered the much smaller cells of the workers, from which, as from the other compartments, a number

of tunnels, or galleries, lead to the outer circumference of the mound. From the floor * of the termitary—as the nest is sometimes called—holes perforate the earth, becoming larger as they descend; but these do not represent any addition to the architecture of the building, being merely the pits from which the materials that have gone to make it, have been extracted. Except the royal cell, the whole of this great edifice—equally remarkable in regard to its size and its architecture—is reared by the worker termites: but this, as being the foundation-stone of the whole, must necessarily, it would seem, be the work of the two founders, there being no one else to help them till after the hatching of the eggs.

Both the male and female are at first winged—as is the case with the real ants—but after the marriage flight they voluntarily break them off, as do these, and then set to work to found a colony. Whether the two entirely immure themselves in the cell, or chamber, referred to, or whether they only partially do so, and are assisted afterwards by the workers yet unborn, I cannot state, inasmuch as I have not watched the founding of a nest myself, and such authorities as I have been able to turn to, though writing as observers, say nothing on this head. Evidently they don't know, but they don't tell you that, either. However, be this as it may, the royal pair are, at some point in the earlier part of their career, enclosed

* This floor, however, according to Professor Drummond, may be sunk considerably below the level of the ground, which would make it, more properly speaking, a basement.

in a compartment which may, at first, be roomy, but which, in this case, rapidly becomes, by the swelling of the queen's body, now stored with thousands of eggs, only just able to contain them. The queen herself, in fact, whose abdomen has now become a long, white cylindrical object, like the blown-out finger-stall of a white kid glove, almost fills the space with this alone, her head and thorax being, in comparison with it, of as contemptible dimensions as are those of a bean-stalk, compared with its bean. Yet, besides herself, there is room not only for the male, but for some of the workers, which are very small, and enter the cell through a line of small holes, running round it, longitudinally, in the centre. Through these holes the king and queen are fed by the workers, which have probably bored them, since they but just admit their own bodies.

This, however, is the least part of their duties. Very soon the queen begins to lay her eggs, and continues to do so day and night, without intermission, at the astonishing rate of from sixty to eighty thousand in the twenty-four hours. All are carried out by the workers, and deposited, eventually, in the nursery which they themselves have prepared for them. Since, however, the very workers which do this have first to be born, it seems evident that the earlier eggs must for some time lie where they fall, and perhaps be afterwards stored somewhere else, whilst the nursery is a-making. The great size that the nest becomes seems to suggest that it is the gradual work of many generations of termites, brought forth by successive

queens. It must, however, have had a beginning, and it is this beginning, as made by a single royal pair, that I have here been considering. It is quite possible that nobody may yet have watched it, or both watched and written about it. Probably it is most difficult—perhaps impossible—to do so; but it is irritating to read that the nest is founded in this way, and find not so much as an allusion to these obvious difficulties. It is quite as incumbent, I think, on those who watch creatures, to say what they have not been able to find out, as what they have.

The worker termite is about the size of a house-fly, the soldier much larger, with a flat head, enormously large in proportion to the size of his body, and long, curved jaws. These, and the thorax, are of a yellowish brown colour, and have a smooth, polished appearance, whereas the abdomen is a good deal lighter, and soft-looking. Only the soldiers fight. "They stand," says Professor Drummond, "or promenade about, as sentries, at the mouths of the tunnels. When danger threatens, in shape of true ants, the soldier termite advances to the fight. With a few sweeps of its scythe-like jaws, it clears the ground, and whilst the attacking party is carrying off its dead, the builders, unconscious of the fray, quietly continue their work." The latter, besides building the wonderful colossal nest, feeding the king and queen, and storing the eggs, as described, bring food to the nest, and feed and attend to the young, in all their stages. Besides the king and queen that have founded the termitary,

other males and females are kept and attended to in it, by the workers, and these, should anything happen to the sovereigns, are ready to reign and lay eggs in their stead.

White ants are enormously destructive, and a great pest to civilised man, wherever the two come in contact. Their food is, for the most part, vegetable, but they are ready to destroy, if not to eat, almost anything. Their habit is to bore into any solid substance, and eat out its interior, leaving it hollow, with its outer surface, represented by a thin shell, intact. Such an object may be a chair, perhaps, or a table that was once, and still continues to look, of massive build. Now, however, should it be sat upon, or laid as usual, it collapses as though made of tinder. White ants have established themselves, to some extent, in Southern Europe, even in Southern France, where they have done great mischief. The navy-yard in Rochefort was, in part, destroyed by them, and their ravages at the Prefecture of La Rochelle have been minutely described by M. de Quatrefages. They extended even to the archives. "One day it was discovered that the archives of the Department were almost totally destroyed, and that without the slightest external trace of any damage. The termites had reached the boxes in which these documents were preserved, by mining the wainscoting; and they had then leisurely set to work to devour these administrative records, carefully respecting the upper sheets and the margin of each leaf, so that a box which was only a mass of rubbish, seemed to contain

a pile of papers in perfect order." I do not know if a similar misfortune has ever occurred at any of the French schools. A sudden discovery that all the class-books were in the condition described must have caused great lamentations amongst *les élèves.**

Like ants, the termites, or white ants, have many enemies, but all of these, save one (at least in Africa) are content to seek them after they have issued from their stronghold. Innumerable birds make prey of the males and females, during their marriage flight, fowls leap into the air to catch them, when flying low, whilst toads, frogs, lizards, and some of the smaller insect-eating mammals show their appreciation of their soft, succulent bodies, whenever they alight on the ground. But one large, strange creature there is that, specialised for their destruction, assaults them in their fortress, and lives almost wholly upon them. This is the aard vark, or earth-hog, as the Boers of South Africa call him, an uncouth, naked-looking animal about the size of a pig, with tremendous claws, great, muscular, bowed fore legs, a proboscis-like snout, and long, narrow ears like a donkey's. This gargoyle-like creature lies hidden during the day, as though shunning, then, to reveal itself; but when semi-darkness, by giving new, weird shapes to familiar objects, has made earth more in harmony with its portentous appearance, it issues forth and proceeds, in

* In spite of the damage done by them, however, white ants, by turning over the soil, play an important part in the economy of nature, and take, in the tropics, the place of earthworms. See Professor Drummond's *Tropical Africa.*

course of time, to an inhabited termite mound. Jumping up against this—now, perhaps, in the pale moonlight—it digs its curved claws into the hard, baked crust, and bowing in its strong forearms with a mighty effort, tears a hole in the nest's side, and lays bare its interior. The indignant and ever-valiant soldiers rush out through the ruins, prepared to grapple with any foe of any shape. But the gristly snout and thick, hard skin, though but scantily clothed with coarse hair, are impervious to all their attacks, whilst from the tubular mouth is shot forth constantly, and withdrawn again, a long, thin, worm-like object, which, licking amidst the wreck of halls and galleries, sweeps thousands back with it, in each retreat. By morning the once proud edifice may be a mere shell, from which the destroyer, filled to satiety with its whilom inhabitants, now walks slowly away, to lie asleep and digesting them, till the following evening calls him to another meal.

The part which the aard vark plays in South Africa is taken in South America by the great ant-eater, or ant-bear, a creature about the same size, or even larger, and, if possible, of still more extraordinary appearance. It is something of the same general shape, but thinner and narrower, the fore legs are even more bowed, enormously powerful, and are armed with four curved claws so extremely long that the animal has to walk on them, for they turn inwards, instead of outwards like a dog's. The snout is like a very long tube—next to the elephant's, perhaps, it is the most elongated of any in the

animal kingdom—and out of it a tongue of corresponding length is projected, which is always moist with a glutinous liquid, emitted from two large glands situated just below its root. Its body is covered with long, coarse hair, which is especially thick on the back, and becomes longer towards the hindquarters, till on the tail, which is immense, it is like a great flowing mane. This huge tail, which is not only long, but broad, can be turned right over the animal's back, so as to make a great umbrella, or canopy, under which it is said sometimes to walk. Whether it really walks with it held in this way, I do not know. I have not seen it do so at the Zoological Gardens; but there it is under cover, and the ant-eater is said to put its tail to the use of a real umbrella. When it sleeps, however, it, as it were, curls itself up in it, and is thus concealed, or perhaps protected from a sudden assault.

Waterton says of the ant-eater "Without swiftness to enable him to escape from his enemies, without teeth, the possession of which would assist him in self-defence, and without the power of burrowing in the ground, by which he might conceal himself from his pursuers, he still is capable of ranging through these wilds in perfect safety, nor does he fear the fatal pressure of the serpent's fold, or the teeth of the famished jaguar. Nature has formed his fore legs wonderfully thick and strong and muscular, and armed his feet with three tremendous, sharp and crooked claws. Whenever he seizes an animal with these formidable weapons, he hugs it close

to his body and keeps it there till it dies through pressure or through want of food. Nor does the ant-bear, in the meantime, suffer much from loss of aliment, as it is a well-known fact that he can go longer without food than, perhaps, any other animal, except the land-tortoise." *

Waterton also tells us that "the Indians have a great dread of coming in contact with the ant-bear; and after disabling him in the chase" (for they esteem his flesh a dainty) "never think of approaching him till he be quite dead." It is with good reason that they are thus cautious, for were they not so, their life might pay the penalty, as the following account will show: "An Indian, living near Rorainea, was hunting in the forest to the north of that mountain, with some others, armed with his long blow-pipe. In returning home, considerably in advance of the rest of the party, it is supposed that he saw a young ant-eater, and taking it up in his arms, was carrying it home, when its mother gave chase, overtook and killed him; for when his companions came up, they found him lying dead on his face, in the embrace of the ant-bear, one of its large claws having entered his heart. In the struggle he had managed to stick his knife behind his back into the animal, which bled to death, but not before the poor fellow had succumbed to its terrible hug. It was evident that he had only heard the ant-eater coming when it was close upon him, and, in turning round to look, his blow-pipe got caught across the path

* *Wanderings in South America*, pp. 223–4.

in front of him, then, as he turned to run, it formed a bar to his progress, and he fell over it as the animal seized him. So firmly had the animal grappled him, that to separate it from the corpse, the Indians had to cut off its fore legs."* Such a mishap as this, however, must be of extremely rare occurrence.

A very different creature to the ant-bear or the ant-hog (aard vark) is the ant-lion. In its mature state it is like a dragon-fly, to which order of insects (for it is an insect) it belongs, but whilst still in the larval or caterpillar condition it looks something like a fat spider with six, instead of eight, very feeble legs, with the last pair of which, only, it is able to move, but only slowly, and backwards instead of forwards. It is, therefore, quite unable to chase and catch an ant, and yet on ants and other equally active insects it manages to prey. To do so it employs a stratagem which has long been known and marvelled at. "Depressing," says Wood, "the end of its abdomen, and crawling backwards in a circular direction, it traces a shallow trench, the circle varying from one to three inches in diameter. It then makes another round, starting just within the first circle, and so it proceeds, continually scooping up the sand with its head, and jerking it outside the limits of its trench. By continuing this process, and always tracing smaller and smaller circles, the grub at last completes a conical pit, and then buries itself in the sand, holding the mandibles widely extended. Should an insect, an ant, for example, happen

* *Wanderings in South America.*

to pass near the pitfall, it will be sure to go and look into the cavity, partly out of the insatiable curiosity which distinguishes ants, cats, monkeys, and children, and partly out of a desire to obtain food. No sooner has the ant approached the margin of the pitfall than the treacherous soil gives way, the poor insect goes tumbling and rolling down the yielding sides of the pit, and falls into the extended jaws that are waiting for it at the bottom. A smart bite kills the ant, the juices are extracted, the empty carcase is jerked out of the pit, and the ant-lion settles itself in readiness for another victim."

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## CHAPTER XI

AQUATIC ARCHERY—THE ANGLER-FISH AND THE CUTTLEFISH—INSECT ARTILLERY—EELS THAT GIVE ELECTRIC SHOCKS.

IN the ant-lion that we have just been talking about it might be thought that the summit of strategy, as employed by one animal to prey upon another, had been reached. Inasmuch as the archer-fish uses only the weapon with which Nature has provided it, and does not add to its efficacy by any artifice other than that of simple stalking—as it constructs nothing, in a word—perhaps its instinct is not really so extraordinary as that of the insect in question. But there is something so bizarre in it, so striking to the imagination—the idea is so pretty and quaint—that when one first reads about it—for only the far-travelled few are lucky enough to see it—it impresses one even more.

This wonderful little fish—for it is not more than six or seven inches long—is a native of Java and other parts of the Indian Archipelago. It is of a curious appearance, the body being much compressed—as though it had been flattened out sideways—and its dorsal fin is spiny, like that of the perch, but set much further back, so that it almost touches the tail. The head is pointed, with the lower jaw

or lip projecting beyond the upper one, but the most distinctive feature is the eye, which is extremely large and round, so that it imparts a look of strange staring surprise, to which, no doubt, the creature is a stranger. The surprise is not on the part of the fish, but on that of any insect of moderate dimensions which may happen to be resting on a leaf or flower overhanging the water, and not more than four or five feet above it. The archer-fish, observing it there, swims as near as it can underneath it, and then, approaching its mouth to the surface of the stream, whilst it hangs stationary with pulsating fins, squirts, all at once, out of it a little shower of water-drops, which, striking the insect—bee, fly, moth, or grasshopper—knocks it off into the river. As it falls, the successful marksman lowers its head, and poising itself for a moment, after a few backward strokes, darts on the floating spoil, and devours it.

The aim is remarkably sure, nor is the feat a slight one, seeing that the drops are projected to some eight or ten times the length of the fish. By this curious sort of archery, or, rather, water-fire—for the drops fly out, as from the muzzle of a little live gun—an easy living is procurable. *Toxotes jaculator* (that is its Latin name) is not, like other fish, dependent on the chance of an accidental immersion. Swimming quietly along, under banks heavy with tropical foliage, it peers hopefully up into that flowery firmament, from which its manna is to fall. The keen eye, armed with a sight in proportion to its uncommon size, examines each leaf, each petal, each bending stem or pendent, swaying creeper—the fringe of

a world unknown beyond it—and carefully estimates the distance at which an insect buzzes or settles. Anything beyond six feet or so is a "bright particular star," which it were hopeless to attempt—but within that distance the fairest things are attainable; up spurts the glistening shower and down with it, like Iris on her rainbow, the radiant being comes. It is a pretty, clean sort of shooting, without noise, wounds, or blood, much superior to our own.

Several little fishes, besides the one to which in especial the name of archer has been given, practise this curious and, except for themselves, unique art. But they are all nearly related—all belong to the Acanthopterigious family of Squamipennes or Chætodontidæ—for those are the sort of names that they call them in scientific works. One of these other kinds is a favourite with the Chinese in Java, who keep it in jars, and feed it with flies or other insects, which they place on their edges for the little archers to knock off. Possibly there may be some other animals, besides these fishes, which obtain their prey by shooting water at it, but I do not, myself, know of any before we come to man. The Australian savages chase bees to their hives, by encumbering their wings with cotton or something similar, and they first catch the bees by filling their mouths with water, and squirting it out over them. Thus we find in man the nearest approach to the archer-fish, and it is to him, too, that we must look for a parallel, artificially brought about, to the natural art of another of the great fish family, viz. the angler or sea-devil.

This wonderfully provided creature has an enormous

head, on the top of which grow three long filaments, two forward, and close together, and the third a good deal farther back. The front filament of all, bends forward and seems to dangle from its end, in front of the angler's huge mouth, a little silvery tuft, or piece, of something, so that the whole has a wonderful resemblance to a fishing-rod and line, with a baited hook at the end of it. The owner of this curious arrangement lies along the bottom of the sea, near the shore, almost hidden in the sand, and when a small fish, attracted by the shining appendage, comes to nibble at it, makes a rush and engulfs, rather than seizes, it in its cavernous jaws. The object, which thus plays the part of a bait, is really an expansion of the filament itself. The creature is thus provided with a natural fishing-rod, which, however, is designed only to attract the prey about the bait, and not to hook and haul it up. In this way the game is lured within the angler's reach, and the actual catching of it is done by the mouth, in the ordinary way.

In addition to this natural ruse, or, rather, as a supplement to it, the angler-fish is said purposely to stir up the sand, so as to dislodge the marine worms or other creatures which dwell there, which then float about in the water, so that they play the same part that ground-bait does when thrown in around the float. The discoloured water, full of living creatures or inorganic particles, brings numbers of fish there, to feed on them, whilst the silvery filament swaying and dancing in the middle of the cloud, becomes to each one the more particular attraction. The angler-fish is fairly common, about our own shores. It grows to

a length of some three or four feet, and appears to consist of but head and tail—so huge is the size of the former, into which the body seems to be absorbed. The wide mouth is set with sharp teeth, and suggests, when opened, a ravenous voracity, which is, indeed, the angler's chief characteristic.

As has been remarked, the principles on which the two foregoing artifices are based, have been applied by man, in an essentially similar manner, to meet the exigencies of his own affairs, but I am not sure whether this is equally the case in regard to another and well-known device which is employed by the cuttlefish. This creature, which, as will be seen in a later chapter, sometimes grows to an enormous size, though popularly called a fish, is not really one. It is a mollusc, and belongs to the most perfectly organised family of that extensive order of beings—viz. to the cephalopods. This is a word which, in English, means the head-foots, and as a descriptive term it is properly employed, since the limbs of the cuttlefish—which can be used either as arms or feet—grow from the orifice of the mouth, and so may be considered, equally with the latter, as belonging to the head. These limbs are the well-known tentacles, and in number may be either eight—which makes their possessor an octopod—or ten, by which it becomes entitled to the rank of a decapod. In the latter case, two of these organs have become specially modified, being much longer than the other ones, and enlarged at their ends, upon which alone the suckers are situated. On the remaining eight—or on all the eight in the case of the

octopods—the suckers run along the whole length of the limb, from base to tip, being disposed in two or more rows, upon the inner surface of it. They are circular discs, and if we wish to picture them and the office which they perform, we cannot do better than imagine ourselves with eight long lips, each of which is provided with so many little miniature mouths that can suck very hard, but not bite or swallow. In the centre of this wonderful lip arrangement is our big mouth—the real one—only slightly changed, so that the teeth are represented by a great horny beak, shaped like a parrot's and quite as effective. As for the rest of us—to continue the illustration—all our four limbs have gone, so that there is only our body, which is now like a large sack or purse. Changed in this way, we can no longer lead the life that we have been accustomed to. We live in the sea, now, and are usually at the bottom of it, holding on to rocks or stones with some of our sucking tentacles, and often getting our soft, unarmed bodies into holes and crevices, the better to protect them. Our long lip-arms are always waving about in the water, and when we are hungry we throw them round anything that we care about eating, suck on to it with all our little mouths, and bite and swallow it with our big one. We need not go very far to supply our wants. Our waving tentacles look very like the seaweeds that we live amongst, so that fish, crabs, starfish, and all sorts of other living creatures are constantly swimming up against us, and when we like them and are hungry, we always treat them in this way. The shell of the crab must be hard that we cannot crack

with our great parrot beak, and the fish must be clever that can avoid our embraces, since the faster it goes the faster we go with it. We hug it till it stops, and then eat it—we do not understand letting go.

Such and so strange a creature is the cuttlefish, but perhaps the strangest, or at least the most interesting, thing about it, is that device that it practises, and which I began by alluding to. In its body there is a sort of bag, containing a fluid from which ink and the pigment known as sepia are prepared, and which is of a deep brown colour. This bag or gland has an opening near the end of the body, through which the fluid can be ejected into the sea, which then becomes discoloured. There is another opening near the creature's mouth, and through this water can be expelled by it, in the same way but with greater violence. When, therefore, the cuttlefish is alarmed, and wishes to "lie low," it spurts out the water with such force that its body flies backwards, and, at the same time, empties the contents of its ink-bag, thus making for itself a cloudy sanctuary, into the midst of which it disappears. After a time the water clears again, but the cuttlefish, in all probability, is nowhere to be seen.

It would be difficult to think of anything more *rusé* than this, within the limits of the animal kingdom; but certain beetles play a trick which is quite as ingenious, and perhaps even more remarkable. These are the bombardier beetles, as they are very appropriately called, little creatures not more than the third of an inch long, and with nothing very remarkable about their appearance.

When, however, they are pursued by some larger beetle, or other insect, of carnivorous habits, all at once, just as they seem on the point of being overtaken, they fire off a gun, and the pursuer rolls head over heels. That, at least, is what it looks like. There is smoke and a sudden bang that one can just hear, and it seems as if the big beetle had been shot. What really happens is this: the bombardier beetle discharges from a gland in the posterior portion of the abdomen, with which it is furnished, a very acid fluid, which, by a chemical process, when it meets the air, volatilises into smoke, with a slight explosion. Whether it is the explosion or the acid properties of the fluid, or some disagreeable smell it has, which upsets the beetle that is in pursuit, I am not quite sure. If the latter, then the bombardier beetle is something like the skunk, an animal we shall have something to say about later on, but I think it is the actual explosion, which, though weaker, acts in the same way as an explosion of gunpowder does. Whatever may be the reason, the effect is very remarkable, and in this sudden discharge by the little beetle, with the consequent instantaneous collapse of its enemy, we see one of the most ingenious of Nature's devices for protecting her little children against her big ones. To look at, it is perhaps the most wonderful of all, for it is just like real artillery —smoke, an explosion, and then over rolls somebody—a regular battlefield.

Angling, dyeing, archery, artillery—where will it end? If it does not stop soon it will get to electricity; and, sure enough, in the gymnotus—a large eel that inhabits

the rivers of Brazil and Guiana—we have a creature with an electric battery inside it, with which it can deliver shocks so powerful, that they are capable of killing a man or stunning a horse. I do not know if the alligators that live in the same rivers with it—for instance, the Orinoco—ever attack this eel. It would be an interesting thing to see one do so, but the probability is that the alligator knows what the gymnotus is, and never touches it except by accident. This, however, must sometimes occur, but what the result would be in the case of so sluggish a reptile, I cannot say. Of course, it is only the big eels that give such severe shocks as these. The gymnotus grows to six feet in length, and one of this size must be a more dangerous creature, if one happens to run up against it, than a man-eating tiger or a rogue elephant. Its habits are sluggish, as one might expect, for it has no need to get out of the way of anything, and it is a good deal easier for it to kill its prey by lying still in the mud, and allowing it to touch it, than it would be to pursue a fish, for instance, and rub up against it in the water.

To receive the shock it is necessary that the creature, whatever it may be—in most cases, probably, a fish—should touch the eel's body in two places, for otherwise the electric circuit will not be completed, and there will be no discharge. Merely to poke the eel, therefore, with one finger would do one no harm, whereas to catch hold of a large one might even cause death. Yet in spite of the dangerous power it possesses, the torpedo is eaten by the natives of the countries in which it is found, for it is fat and succulent, and its electric battery, if once it can

be got rid of, does not affect its taste, which is excellent. Once caught, this is not a difficult thing to do. It can be cut out, though care must be taken in the way above-mentioned, since the shock can be communicated not only by a direct seizure of the creature, but indirectly through any connecting substance held in the hand. But how are the eels to be caught? The method employed by the Indians is to make them exhaust their batteries by delivering a series of shocks, after which they remain for a long time innocuous, till re-stored with the electric energy. When, therefore, any large shallow pool is discovered, in which gymnoti are likely to be lying—such being often produced by the overflowing of rivers and subsequent withdrawal of their waters—a troop of half-wild horses are collected about it, and then, with cries and blows, urged to enter. A wild and horrible scene of confusion instantly ensues. The alarmed eels dart hither and thither amongst the legs of the horses, discharging their batteries, and the horses, when struck, leap into the air, and, if the shock has been violent, fall down stunned, amongst the rest. Others, less injured, but mad with pain and terror, lash out with their heels, or gallop wildly about, no longer avoiding their fellows, and seeming to have lost the sense of direction. Dashing together, one horse is flung down by another—others fall over them—they lie struggling in heaps. Many break back, or reach the further shore, but each time that they do so, and strive to leave the pool, they are driven into it again by the Indians, and shock after shock continues to be poured in amongst them. Each one, however, is weaker than

the last, till, at length, no more effect is produced, and the scene, though still wild and disorderly, becomes partially relieved of its horrors. Then, and not till then, are the terrified animals—all those, that is to say, that are capable of doing so—allowed to leave their inferno, after which the Indians enter it, and secure the now powerless eels, many of which have been more or less injured by the trampling of the horses' hoofs. Such is the account given by Humboldt, which was given to him by the Indians. It is right to add that it has not yet been confirmed, so that many now hold it to be untrue, and think that the great naturalist and traveller must have been imposed upon. One professor, who writes very learnedly of the gymnotus, and other electric fishes—for there are some other ones—is so sure of this, that he thinks it high time this story of Humboldt's were forgotten. Well, I tried to forget it, but I found it was too picturesque. So I have remembered it, and forgotten the professor's own treatise, instead—which was much the easier thing to do.

## CHAPTER XII

PROTECTIVE RESEMBLANCE IN NATURE—SPIDERS THAT LOOK LIKE ANTS—A TRAP TO CATCH A BUTTERFLY—FALSE DEVOTEES—LEAF, STICK, AND GRASS-RESEMBLING INSECTS—"CUCULLUS NON FACIT MONACHUM."

IN previous chapters we have seen how spiders are preyed upon in a peculiar way, and for a special purpose, by various species of wasps, and how, in a more general manner, they fall victims to ants. There are spiders, however, who escape both wasps and ants, as well as other enemies, against which they are not strong enough to contend, not by running away, merely, or concealing themselves, which are ordinary methods, but by another plan not quite so common in nature, which some people think is only resorted to by ourselves. We, for instance, if we have committed a robbery or anything of that sort, and it is known that we did it, disguise ourselves like somebody else—it does not matter who—so as to get to Spain or America, or anywhere we think best, without being recognised. Or sometimes we do the disguising first, and get the money in that way, dressing up to resemble some person that we pretend to be, or someone in his or her class of life—the nobility mostly—and living in the way that they would do, so that we take people in right and left, and they trust us in a way that they would

never think of doing if they knew that we were only poor, honest people who paid our way, and made no sort of dash or show. Now this is just what some animals, especially insects, do, only whereas we have to dress up for each occasion, and can assume different disguises, they are always disguised in the same way, and whereas we know what we are doing, and why we are doing it, they know nothing at all about it, which last gives them a great advantage, since even the finest acting does not quite come up to nature. Some creatures, in fact, are cheats all their lives through. Their "whole life is a lie," as one of the characters in one of Scott's novels said once, a long time ago, and as thousands of very different sorts of characters in very different kinds of novels, have been saying to or of one another or themselves—or words to that effect—ever since.

And now for examples, which is the only way of getting to understand anything, unless it is very simple indeed. To begin with spiders. There are some that look exactly like ants, so that anyone seeing them for the first time would think that they were ants, and would only find out that they were not, but spiders, by degrees, and perhaps not at all if he were not something of an entomologist. Ants, like all other insects, have six legs, whereas spiders, which are not insects at all, have eight. But the spider, by holding up one of its anterior pair of legs, either the first or the second pair, and bending or pointing them to suit the kind of ant it resembles, makes them look like a pair of antennæ, springing not from its body but from the head. The head itself looks much more like an ant's

than a spider's, and this is still more—or still more remarkably—the case with the body, which is lengthened in various degrees, and shaped in various ways, in accordance with that of the model on which the make-up is founded.

But this is not all, or enough. However much the spider might look like the ants that it lived amongst, yet if it did not move in the same kind of way that they do it would be detected, and in consequence devoured. Spiders do not walk or run about like ants, not, that is to say, with the same sort of mannerisms that they have. Some of them jump, which is a thing that ants never do, and all ants, when in search of booty, move in a funny little zigzagging way from side to side, which gives them a greater chance of finding things than they would have by going straight forward. Now it is just in this way that some of these ant-like spiders habitually walk, and they do not jump any more than the ants themselves, even though they may happen to belong to a family of jumping spiders. Again, when they eat anything, instead of sitting still, to do it, which is what spiders generally do, they keep pulling the morsel, which is generally some live thing, about, as though to divide it into parts, to be carried to the nest separately, which is what ants often do; and all the while they keep moving the two legs which look like a pair of antennæ just in the way in which it is proper for antennæ to move, sometimes tapping their prey with them, and at other times waving them about. No wonder then that the ants are taken in, for, to the boot of all these resemblances, the spider is of the same size and colour as themselves. The result of it all is, of course,

that not an ant of them ever thinks of molesting the spider. He would be a nice tasty morsel for them if they only knew it, and as he is soft and they are hard, they would have no difficulty in overcoming him, even if it were only one to one, instead of one to twenty or more. But as they only see one of themselves running about—and, for my part, I think the spider must feel like an ant, as well as look like one—it never enters their head to attack him, or even not to be polite, for ants of the same nest are very polite to one another.

But here all sorts of questions arise, which, as far as I know, have not yet been answered, and I think that the ways of these spiders ought to be more closely observed. Ants of the same nest, indeed, are quite friendly one with another, but this is not the case if they belong to different nests, whilst there is nothing but hostility, as a rule, between ants of different species. Moreover, one ant can always tell, by some means which we do not yet quite understand, whether another one belongs to its own community or not, and if it does not there is generally a fight between them, unless one of the two runs away. It would seem, therefore, as if, for its disguise to be of much use to the spider, it would have to keep not only with one species, but with one special community of ants, and even then it ought to be found out, unless it lives with them as a parasite in their nest, as some insects and other creatures do. Is this the case, or does the spider take care not to come into actual contact with the ants, so that just by looking like one at a little distance, it is left alone? But, even so, it would be only one species of ant that would be

inclined to let him alone, and as other species would be hostile to the one he resembled, one can imagine inconveniences as well as benefits arising through the disguise. For the above reasons I think it would be very interesting to find out a little more about the habits of these ant-resembling spiders. Of course if they preyed upon the ants they resembled, the thing would be easy to understand. But this, as has already been said or implied, is not the case.

Other kinds of spiders are protected in the same way by resembling different kinds of things, which are not good to eat, and as, in this way, they are saved not only from ants, but from all sorts of other creatures, as well, —from all those, for instance, that prey upon ants—this seems to me a much better kind of disguise. One of these spiders lives in Madagascar, and has the most peculiar-shaped body that one can imagine. At the top it runs up into a sort of pyramid, starting from a rounded base and being higher at one side than another, whilst round about it there are several smaller pyramids, or spikey protuberances, quite babies compared to the large one. On a table, perhaps, or in that horrid thing, a cabinet, it might be difficult to say what this spider was intended to look like, but when it sits motionless, according to its habit, on the branch of a tree, it is impossible to distinguish it from one of those woody knots which often form themselves on the bark, and which the eye rests on without particularly noticing. Another kind, common in Wisconsin, lives upon the cedar trees, which are a common feature—and a very picturesque one—of

the country. They are covered with lichens, and so much does this spider, in its coloration and markings, resemble a lichen, itself, that when it sits still amongst them the eye is unable to pick it out from its surroundings.

But all this is as nothing compared to a Javanese spider, the whole of whose energies seem bent to make itself into a living facsimile of so mean an object as a bird-dropping. To do this, it lies on its back upon a leaf, over some part of which it has previously spread a film-like web, which itself plays a part in the deception. "Such excreta," says Mr. Fobes, the discoverer of this wonderful spider, and who was, himself, taken in by it, "consist of a central and denser portion of a pure white chalk-like colour streaked, here and there, with black and surrounded by a thin border of the dried-up, more fluid part." The filmy web spread irregularly over the leaf, presents this latter appearance, whilst the spider itself, having a chalky-white abdomen and black legs, which, as it lies, are crossed over it, exactly resembles the solid mass in the centre of it. In the previous cases that we have been considering, the resemblance is of a protective nature—this, at least, is what seems more specially aimed at—but here the design is darker and deeper. Many butterflies—creatures typical of beauty generally—as if resolved to carry on the allegory, are accustomed to feed upon ordure. One of them, fluttering through the leaves of the tropical forest, perceives, as she thinks, a rich banquet spread out before her, and descending, in all her radiant and ethereal beauty, to enjoy it, is caught and feasted on herself.

Here, then, we have an aggressive, as well as a protective, resemblance—for, no doubt, the two are combined—of which principle we have another example in a certain mantis of India, which resembles, in a manner equally deceptive, if not quite so perfect, a more attractive object, namely, a flower. Most of us have seen pictures of the ordinary green praying mantis, a curious kind of insect, allied to the grasshoppers, that has received its name owing to its habit of sitting motionless with the fore part of its body raised, and its fore legs extended, as though it were praying. Really, however, it is waiting for its prey, which, when it approaches, it cuts to pieces by pressing together, as though it were shutting a knife, the flattened and blade-like joints of the legs it has held out so holily; first, of course, having got the victim between them. The mantis in question does not look quite like the praying one. Instead of rearing itself upright, it sits flat on the leaf, and its body is not green, but pink. Being rounded, it passes for the centre of a flower, whilst the legs, which diverge from it at different angles, and are flattened in the most extraordinary manner, bear a still more striking resemblance to the petals. Sitting thus, a flower amongst flowers, it is approached by many insects which, too late, discover the real nature of that somewhat strange-looking blossom.

Here, then, we have a flower-insect. Stick-insects—walking-stick insects as we call them—or grass-insects, are more common. They are especially abundant in Central Africa. Anyone who sees one of these creatures for the first time is infallibly taken in by them, though he may

have read about them often, and made up his mind not to be. He is strengthening himself, perhaps, in this resolution, at the moment when, having at last got to the country where they abound, he happens to be brushing away, with his hand, a small wisp of hay or dry grass that he sees clinging to his coat. But that wisp of hay is the very insect he has set himself to recognise, but which now, even when his native servants point it out to him and tell him what it is, he cannot for the life of him make out to be anything but what it looks like. It is just a slight stem of yellow, withered grass, from which six still slighter pieces hang, at intervals, in pairs. Bend the stem as you will, and twist the bits that hang from it how you like, they all stay just as you put them, as long as they have anything to rest against. But if you take the thing, at any point, between your thumb and finger, and hold it in the air, then the other parts of it will either remain stiff or dangle down, just as you would expect them to do, if it were a piece of grass that you held. The insect seems jointed everywhere, so that, what with this, and the thinness and ridiculous length of its body and all its legs, it does not even look like a healthy growing grass, but only a long, thin bit that has first been broken off, then broken again, in all sorts of places, and, finally, crushed up, squeezed and crumpled together in the hand. Yet the insect which it really is, has a head, eyes, antennæ, thorax, abdomen, and all the internal organs like any other one, and it breathes, sleeps, eats, and digests upon just the same principles. There are thousands of these wonderful grass-insects, and almost as

many different species of them. All about, wherever the grass springs up in patches, amidst the forests of equatorial Africa, they form, as it were, a sort of second animal crop, living amongst the vegetable one and indistinguishable from it. When they leap from one stem to another, then, all at once, they are seen; but the instant they alight they become invisible again, vanishing under one's very eyes, whilst one looks at them, as if by magic. What is most wonderful is that as the tintings of the true grasses change with the season, so do those of the false ones that cling to them. From the bright, vivid green of the fresh spring crops, through the later darker greens, and the golds and reds of autumn, all is mimicked, the one change keeps pace with the other, but whether it is a sequence of different imitative creatures—like the rotation of crops—or whether it is not the species, but only their colours, which change, does not appear to be certain, though, probably, it is the latter.

Other insects imitate mosses or lichens, whilst a still greater number, perhaps, are the counterparts of all kinds of leaves—from the fresh young green ones to those which are sere and yellow. To these belong the mantises which we have just been talking about, besides a whole host of locusts and grasshoppers. One of these latter was seen by Mr. Belt, in Nicaragua, standing perfectly still in the midst of an army of foraging ants, numbers of which kept passing over its body, and would at once have torn it to pieces, had they had the smallest idea that it was not what it pretended to be. This locust had wings, like others of its family, and could easily, by their

aid, have got away from the ants. This, however, would not have saved its life, for the air and surrounding trees were full of birds that were busily engaged in catching such insects as the ants put up. Knowing, therefore, that it would only be flying from danger to certain death, it preferred, or, rather, its instinct taught it, to stay and brave the former, which it might do with a very fair chance, though not quite a certainty, of success. That there was no choice in the matter we may, I think, assume, because with all these creatures that imitate still life, there is a strong instinct to be still themselves whenever there is cause for alarm—and indeed generally, as long as moving can be dispensed with. This is, indeed, a part of the deception, since it is obvious to the meanest capacity of bird or predaceous insect, that a leaf, for instance, that walks about, cannot really be a leaf.

Neither can it, when it, all at once, comes off its stalk and begins to fly about, in the shape of a butterfly, which is what happens, sometimes, in India and the Malay Archipelago, as we shall immediately see. In these countries there is a butterfly that belongs to the same family as our own purple emperor, and, as far as the upper surface of its wings is concerned, it is a purple emperor, and so looks like one, when it flies. But as soon as it settles, it becomes a leaf, for then it raises its wings above its back, in the way butterflies do, so that only their under surface is seen, which is as like a dry brown leaf as anything that is not one can be. The shape is exact, from the extreme point, or tip, of the upper wing, to the little swallow tail at the end of the lower one, which last just

touches the stem that the butterfly clings on, and makes the stalk of the leaf. Between the tip and the stalk there runs a well-marked dark line, which answers very well for the leaf's mid-rib, whilst on each side of it thinner lines are traced, representing the lateral veins. The slender legs of the butterfly, as it sits on the stalk, are hardly to be seen, and its head lies just hidden between the margins of the wings. The leaves of the bush on which it has gone down are of the same shape and colour as itself, for it takes care not to settle amidst surroundings with which it would not be in harmony. A bird, therefore, that has pursued this brilliant blue butterfly into a bush, where it disappears, is completely baffled; and so, too, is a grave scientific gentleman with a butterfly-net in his hand.

The above, I believe, is the best example known of a butterfly that escapes its enemies by looking like a leaf, or any other inanimate object; but there are others where the take-in is of a still more curious and unexpected kind. Certain butterflies have bitter juices in their bodies, and for this reason are let alone by birds and other enemies. As a consequence, other butterflies belonging to quite different families, have taken to mimicking them—just as if *they* were leaves or sticks or grasses —so that, being mistaken for them, they are let alone too. If they were not so mistaken, they would be eaten at once—or at least whenever they could be caught—for their juices are very nice indeed. What seems still more extraordinary is that, in some cases, the nasty butterfly is mimicked only by the female of the nice one, and not by

the male. Thus there is a butterfly in Africa, the male of which is a beautiful swallow-tail, but the female has no tails to her wings, and both in shape and colouring she is just like another butterfly, not nearly so handsome, and which is not a swallow-tail at all. What can be the reason of this? What can account for this favouritism in Nature?—for that is what it seems like. Why should only the nice-tasting female be protected, and not the equally nice-tasting male? But the male, it appears, can fly faster, and he is not bothered by having to lay eggs, like the female. The female, with eggs in her body, is heavier than he, and whilst she is laying them she has to sit still. This is the explanation generally given for a fact so remarkable. I confess that I don't feel quite satisfied with it, but it is difficult to think of a better one. At any rate, there are the facts. Butterflies mimic each other, and pretend to belong to families which they really don't belong to—just as adventurers do.

But it may be said, how can one tell which is which, or, if two butterflies look exactly alike, how can we tell that they do belong to two families, and not to one and the same? But if one dissects a leaf-, or a walking-stick-insect, one does not find that it is like a leaf, or a piece of twig, inside, and just in the same way, though the difference is not so great, the two butterflies that look so much alike, are found to differ, on dissection. The internal organs of the mimicking kind have not been changed in the same way that its colouring and shape have been—for that would have done it no good—and then, again, it is not quite exactly like the other one; there is some differ-

ence, a little more, perhaps, than that between Tweedle dum and Tweedledee, which would be enough for an entomologist, when he had the two on a table, to be able to tell.

It is not only amongst insects that these curious cases of beneficial resemblance are to be found, that creatures live, as it were, a false life, and are not what they seem to be. The device, indeed, is not so frequently resorted to in the case of any other order of animals, and when it is, it is not, as a rule, so marked—not of such a definite nature as with insects, and some other of the smaller class of creatures, but still the principle is there. We have seen the case of the mantis pretending, as it were, to be a flower. There is a certain lizard that does much the same thing, for the skin at the angle of its mouth, on each side, is puckered up into a little red flower, just like one that grows in the sand, where it lives. Insects, thinking to come to the flower, come to the lizard's mouth instead, and are soon gobbled up. Insects are things which often fly into manifest danger, but still, if they saw the lizard they would be less likely to come to the flower. But now this lizard's body is exactly the colour of the sand that it lies in, so that it can hardly be seen, and this sort of general resemblance is much more common amongst birds and mammalia than the more special ones that we have been considering. I do not, indeed, know any case of one quadruped escaping destruction, by being mistaken for another, or for a rock or tree, but amongst birds there are just a few instances of this. In the Malay Archipelago, for instance, there are some loud, noisy birds which are

called "Friar-birds," because some of the feathers on their necks curl up over their heads, like a friar's cape or cowl. They have powerful beaks and claws, which they know how to use, and, as they fly about in flocks, they are very well able to take care of themselves. There are different species of these friar-birds on each of the larger islands, and in each of these islands—flying in the same flock with them—is a bird of a quite different family, and as timid and retiring as the others are bold and aggressive. Orioles these attendant birds are, and the typical oriole is as different from a friar-bird in appearance as it is in disposition. But these particular ones resemble them so exactly that they have been mistaken for friar-birds by scientific gentlemen, with the two together in their hands, and have even got mixed up with them in scientific works —flying with them still, through those dry, dead leaves, as though they were the living forests of their native land. Thus in a great scientific French book, called *Voyage de l'Astrolabe*, an oriole of Bouru is both described and figured as a friar-bird, keeping up the joke, or the fiction, to the very last. However, as far as that is concerned, I have no doubt that the oriole thinks he really is a friar-bird, or, at least, feels as if he was one, which would come to much the same thing.

When first these cases of imitation, or mimicry as they are called, began to be noticed,* nobody could tell what to make of them. It seemed plain that one animal could not purposely make itself like another one—or like a twig or

* They had been noticed long before Bates' paper, which was later, if I mistake not, than *The Origin of Species*.

a flower—in the way that an actor dresses up to represent some character on the stage. But how, then, had such marvellous resemblances been brought about? Chance seemed quite out of the question, but nobody had any better explanation to give. The whole thing was a mystery. Gradually, however, the subject came to be better understood. One thing was clear: that the animal—or one of the animals—presenting this extraordinary likeness was always benefited by it. At last came Darwin, who explained everything by natural selection, the principle of which is this, that as no two individuals of any species are born quite alike, some must be born with some sort of an advantage over others, and as these would live longer, and leave a greater number of descendants to inherit this advantage—whatever it might be—all living creatures must, gradually, be getting better and better adapted for the kind of life they have to lead. Supposing, therefore, that two different creatures, living in the same country, had some slight resemblance to one another—and this would not be wonderful—then if this resemblance was an advantage to one of them, it would gradually get more and more like the other, because those individuals that were less like it would get killed off sooner, whilst the others would live longer and leave a greater number of offspring, to carry on the likeness. Those orioles, for instance—to take our last example—which least resembled the friar-birds, would get soonest killed by hawks and kites, whilst those that most resembled them would be most let alone, and so they would lay more eggs, and rear more young birds, and of these

young orioles, some would be even more like the friar-birds than their parents, and so it would go on. The gradually increasing resemblance would be like a portrait that was always being painted and painted, and having finishing touches put to it, without ever being quite finished—an eternal sitter with an eternal artist in front of him; for the sitter, too, would change as time went on, and as he did, so would his portrait have to. This is how Nature, the great artist, paints her portraits, so that when, in speaking of these cases, we say that one creature mimics another we really mean something quite different. Still, mimic, we are told, though it conveys a wrong meaning, is the best word to use, because with it we can express this wrong meaning in so many different ways, having at our disposal "the convenient series of words—mimic, mimicry, mimetic, mimicker, mimicked, mimicking." So we should not call something that is white, white, if, with more flexibility, we could describe it as black—and this, indeed, with the converse, is a principle very much in vogue. The curious thing is, however, that when the likeness is between some creature and a plant or inanimate object, scientists do not say that the former mimics the latter, but that it resembles it. They can put up with the right word then, but not, it appears, in the other case. Yet there is no essential distinction between the two, and the process by which each has been brought about, is identical. So, as one butterfly, say, does really resemble another, but does not really mimic it, why cannot learned gentlemen use the right word here too, instead of speaking a language which neither accords with the fact, nor ex-

presses their real meaning? Even if it does come more pat to describe a thing badly, is it not, nevertheless, better to describe it well? So I say, with Hotspur—

"Oh, while you live tell truth and shame the devil."

For my part I think it is only permissible to use the word "mimic," in this relation, in order to give a vivid impression, not indeed of the thing, but of what the thing seems to be—to arouse interest in it, in fact, which is why I have done so here. But when the process is known the word had better be dropped—at least, in works that really profess to be scientific. This, of course, does not.

## CHAPTER XIII

SPIDERS AND THEIR WEBS—TRAP-DOOR SPIDERS—SPIDERS THAT EAT BIRDS—AQUATIC SPIDERS—BORN IN A DIVING-BELL.

THOUGH we have already had something to say about spiders, they are such interesting creatures that we may as well devote a few pages more to them—especially as the web, which is their most salient peculiarity, has as yet hardly been mentioned. The beauty and ingenuity of this wonderful fabric has always aroused the interest and admiration of mankind, and will doubtless continue to do so, as long as spiders and men exist together on the earth. Our own common garden or geometric spider is as good a web-spinner, perhaps, as any that exists, or, if not, it is at least as good as any that I can think of at the moment. Everyone is familiar with the general appearance of the web and the mathematical regularity of its outline, whilst all who have watched its construction must have been astonished at the skill displayed by the spider, both in the weaving and placing of it. It is composed of two separate parts, the first, or framework, consisting of a number of stout, yet delicate, cables, which radiate outwards from a common centre, whilst around them a finer thread, quite distinct

in its structure, is wound spirally, in wider and wider circles, the last of which makes the circumference. The quality of the thread, composing these two divisions of the web, is as distinct as the parts themselves, for whereas "the radiating lines are smooth and not very elastic, the spiral one is thickly studded with minute knobs, and is elastic to a wonderful degree, reminding the observer of a thread of india-rubber. It is to the little projections that the efficacy of the net is due, for they are composed of a thick adhesive and viscid substance, and serve to arrest the wings and legs of the insects that happen to touch the net."* "As the radii," says Mr. Blackwell (a great authority on British spiders), "are inadhesive, and possess only a moderate share of elasticity, they must consist of a different material from that of the viscid spiral line, which is elastic in an extraordinary degree. Now, the viscidity of this line may be shown to depend entirely upon the globules with which it is studded, for if they be removed by careful application of the finger, a fine glossy filament remains, which is highly elastic, but perfectly inadhesive. As the globules, therefore, and the line on which they are disposed, differ so essentially from each other, and from the radii, it is reasonable to infer that the physical constitution of these several portions of the net must be dissimilar. An estimate," continues Mr. Blackwell, "of the number of viscid globules distributed on the elastic spiral line, in a net of *Epeira apoclisa*, of a medium size, will convey some idea of the elaborate operations performed by the Epeira in the construction

* The Rev. J. G. Wood, in *Homes without Hands*, p. 301.

of their snares. The mean distance between two adjacent radii, in a net of this species, is about seven-tenths of an inch; if, therefore, the number seven be multiplied by twenty (the mean number of viscid globules which occur on one-tenth of an inch of the elastic spiral, at the ordinary degree of tension), the product will be 140, the mean number of globules deposited on seven-tenths of an inch of the elastic spiral line. This product, multiplied by twenty-four, the mean number of circumvolutions described by the elastic spiral line, gives 3,360, the mean number of globules contained between two radii; which, multiplied by twenty-six, the mean number of radii, produces 87,360, the total number of viscid globules in a finished net of average dimensions. A large net, fourteen or sixteen inches in diameter, will be found, by a similar calculation, to contain upwards of 120,000 viscid globules, and yet *Epeira apoclisa* will complete its snare in about forty minutes, if it meet with no interruption."

And yet, in the execution of these beautiful and elaborate webs, the fine threads of which are placed with such nicety, and at such regular distances one from another, that they have procured for their manufacturers the specific title of "*geometric*," the spider is guided entirely by the sense of touch. This is proved by the fact that when confined in total darkness it will spin webs as truly as by daylight; but the test is hardly necessary, since, as the eyes of the spider are situated on the front part of its head, whereas the threads issue from the spinnarets at the extremity of its body and are guided by the hind pair of legs, sight, it is evident, could hardly aid in the process.

Does reason, therefore, enter into the process of web-making, or is it merely an instinctive one? This being a difficult question to answer, instead of doing so I will quote the minute and interesting account given by Thompson in his *Passions of Animals* of how the spider spins its web under ordinary conditions, premising, however, that, in almost every point, different people, who all write as though they had been witnesses of what they describe, appear to differ in their opinion. This remark applies also to the structure of the thread itself, for whilst Wood and Blackwell, as we have just seen, say that this differs essentially in the two parts of the web, Kirby and Spence, who are followed by Professor Romanes, believe it to be one and the same. Büchner, too, speaks of the "high degree of elasticity" of the radii as against the "moderate share" of it, which is all that Blackwell allows them, and so on—ample encouragement this, surely, to observe spiders for ourselves, since whatever we may think, there is sure to be someone respectable to agree with us.

Thompson's account is as follows: "The web of the garden spider—the most ingenious and perfect contrivance that can be imagined—is usually fixed in a perpendicular or somewhat oblique direction, in an opening between the leaves of some plant or shrub; and as it is obvious that round its whole extent lines will be required to which those ends of radii that are farthest from the centre can be attached, the construction of those exterior lines is the spider's first operation. It seems careless about the shape

of the area they are to enclose, well aware that it can as readily inscribe a circle in a triangle as a square; and in this respect it is guided by the distance or proximity of the points to which it can attach them. It spares no pains, however, to strengthen and keep them in a proper degree of tension. With the former view it composes each line of five or six, or even of more threads, glued together; and with the latter it fixes to them from different points a numerous and intricate apparatus of smaller threads; and having thus completed the foundation of its snare, it proceeds to fill up the outline. Attaching a thread to one of the main lines, it walks along it, guiding it with one of its hind legs, that it may not touch in any part and be prematurely glued, and crosses over to the opposite side, where, by applying its spinners, it firmly fixes it. To the middle of this diagonal thread which is to form the centre of its net, it fixes a second, which, in like manner, it conveys and fastens to another part of the lines including the area. The work now proceeds rapidly. During the preliminary operations it sometimes rests, as though its plan required meditation; but no sooner are the marginal lines of the net firmly stretched, and two or three radii spun from its centre, than it continues its labour so quickly and unremittingly that the eye can scarcely follow its process. The radii, to the number of about twenty, giving the net the appearance of a wheel, are speedily finished. It then proceeds to the centre, quickly turns itself round, pulls each thread with its feet, to ascertain its strength, breaking

any one that seems defective, and replacing it by another. Next it glues immediately round the centre five or six small concentric circles, distant about half a line from each other, and then four or five larger ones each separated by the space of half an inch or more. These last serve as a sort of temporary scaffolding to walk over, and to keep the radii properly stretched, while it glues to them the concentric circles that are to remain, which it now proceeds to construct. Placing itself at the circumference, and fastening its thread to the end of one of the radii, it walks up that one towards the centre to such a distance as to draw the thread from its body of a sufficient length to meet the next. Then stepping across and conducting the thread with one of its hind legs, it glues it with its spinners to the point in the adjoining radius to which it is to be fixed. This process it repeats until it has filled up nearly the whole space from the circumference to the centre with concentric circles, distant from each other about two lines. It always, however, leaves a vacant interval around the smallest first-spun circles that are nearest to the centre, and bites away the small cotton-like tuft that united all the radii, which being held now together by the circular threads have thus, probably, their elasticity increased; and in the circular opening resulting from this procedure it takes its station and watches for its prey, or occasionally retires to a little apartment formed under some leaf, which it also uses as a slaughter-house."

The lair thus formed is connected with the web by

means of a thread along which the vibrations caused by the struggles of any captured insect are carried, thus apprising the spider, who, if angry, rushes out to seize her victim. It is a very amusing thing to strike a tuning-fork on some hard substance, and then touch the net with it. The spider, full of excitement, darts towards the area of disturbance, but is bewildered at finding nothing, where the bag seemed so obvious. She may be thus lured out several times in succession, but at length does not come, showing that she can adapt her psychology to an experience which must be for her altogether unprecedented. I have compared her, on these occasions, with a sceptic at a *séance*, when something had unmistakably and unaccountably happened.

More interesting, perhaps, even than the making of the web, is the way in which the spider will sometimes weight it in order to make it steady when a high wind is blowing. There is no doubt about this, as it has been observed by many persons on as many different occasions. I will therefore quote an account at second-hand, as it was given to the late Mr. Wood by one of his friends who was accustomed to watch spiders in his verandah. "One day," says Wood, "a sharp storm broke out and the wind raged so furiously through the garden that the spiders suffered damage from it, although sheltered by the verandah. The mainyards of one of these webs, as the sailors would call them, were broken, so that the web was blown hither and thither, like a slack sail in a storm. The spider made no fresh threads, but tried to help itself

in another way. It let itself down to the ground by a thread and crawled to a place where lay some splintered pieces of a wooden fence thrown down by the storm. It fastened a thread to one of the bits of wood, turned back with it, and hung it with a strong thread to the lower part of its nest, about five feet from the ground. The performance was a wonderful one, for the weight of the wood sufficed to keep the nest tolerably firm, while it was yet light enough to yield to the wind and so prevent further injury. The piece of wood was about two and a half inches long, and as thick as a goose quill. On the following day a careless servant knocked her head against the wood and it fell down. But in the course of a few hours the spider had found it and brought it back to its place. When the storm ceased, the spider mended her web, broke the supporting thread in two, and let the wood fall to the ground." What, it may be asked, could a man have done more? If people were really governed by evidence in their opinions on a great many subjects—for that they are is one of the greatest fallacies in the world—this one case would be sufficient to establish the reasoning powers of all animals standing not lower in the scale than spiders, whilst other instances as good lower down would take it up to them in the same way. But one really believes according to one's wishes, and it is quite surprising that this fact—which can be verified by anyone—is not more generally recognised than it is.

Wonderful as are the webs which are spun by many spiders for the purpose of entrapping their prey, the

houses which some of them make and live in, are, perhaps, even more extraordinary. The trap-door spiders inhabit various parts of the world, but are found in most abundance, or, at least, have attracted most attention, in the island of Jamaica. They, all of them, make a long tunnel or gallery, going down at a steep slant into the earth, and round the sides of this they spin a close web, which makes a strong, durable lining. This lining is double, and whilst the inner layer is soft and smooth like silk, the outer one, in which the spider lives, is so rough and flaky that it both looks and feels more like felt, or rough paper, or the bark of a tree, than a substance usually so delicate as the web of a spider. This roughness, however, is just what is required, since it enables the spider to run up and down its little tube, or tunnel, with the greatest ease. But the most wonderful part of this ingenious dwelling is the trap-door, at its entrance, from which the spider takes its name, and by which it has become famous. This, also, is woven by the spider, and is one in substance with the tube, to which it forms a little door, or lid, which fits its orifice as exactly as does the lid of a neatly made box. Like a box, too, it is attached to the tube by a hinge, the web, at the jointure, being spun in such a manner that we may well give it this name. Before the spider can either enter or leave its tube, the lid of it has to be lifted, and both the creature and its dwelling become, then, conspicuous objects. Once in or out, however, the lid drops, and as it fits into, as well as over, the orifice, there is then no break in the surface of the ground.

Still, if the lid were made only of web, it would be discernible by close observation, since a little round patch of another material would be, as it were, let into the ground. The spider, however, as if fearing this, covers the exterior of the lid with earth which it brings from near about, and by the use of a gummy secretion which it has the power of exuding, causes to adhere to it. The lid, therefore, becomes practically a part of the surrounding earth, from which, when no longer raised above its surface, it is impossible to distinguish it.

If, however, in spite of these artifices, its dwelling should be discovered, the spider, ascending to the mouth of the tube, pulls upon the lid so as to prevent, if possible, its being raised. Mr. Moggridge, who made a study of trap-door spiders, and has written a work upon them, says: "No sooner had I gently touched the door with the point of a penknife than it was drawn slowly downwards with a movement which reminded me of the tightening of a limpet on a sea-rock, so that the crown, which at first projected a little way above, finally lay a little below the surface of the soil. I then contrived to raise the door very gradually, despite the strenuous efforts of the occupant, till at length I was just able to see into the nest and to distinguish the spider holding on to the door with all her might, lying back downwards, with her fangs and all her claws driven into the silk lining of the under surface of the door. The body of the spider was placed across, and filled up the tube, the head being away from the hinge, and she obtained an additional purchase

in this way by blocking up the entrance." When a trap-door spider uses its claws like this to pull down the lid of its tube, they make little holes all round the edge of the inside of the lid. They can be seen, if one looks, quite plainly, and look as if the points of little pins had been stuck into the smooth surface of the web.

Some trap-door spiders are of a large size, and when they lift up the lids of their tunnels, and look cautiously out, they have quite a formidable appearance. During the night, they leave their home, and hunt about for insects of various kinds. As soon as they have caught one they carry it into their dens and devour it there at their leisure. The Rev. Mr. Wood gives an amusing description of this spider's actions. "New-comers," he says, "into the country which the trap-door spider inhabits, are often surprised by seeing the ground open, a little lid lifted up, and a rather formidable spider peer about as if to reconnoitre the position before leaving its fortress. At the least movement on the part of the spectator, back pops the spider, like the cuckoo on a clock, clapping its little door after it quite as smartly as the wooden bird, and, in most cases, succeeds in evading the search of the astonished observer, the soil being apparently unbroken, without a trace of the curious little door that had been so quickly shut."

Some tropical spiders are of very great size, so that, in Brazil, children sometimes tie one end of a piece of string round their waist, and lead them about as if they were dogs. This does not mean, of course, that they are quite

CURIOUS PETS.

Brazilian children tie one end of a piece of string round the waist of Mygales and lead them about as if they were dogs.

so big as dogs—even little ones—but the legs of a very huge mygale, as these monsters are called, might have a spread as great as a man's hand, and the body would be then, perhaps, not so very much smaller than a mouse's. That the webs made by such immense spiders as these should be strong enough to hold a small bird, and that, when caught, the bird should be eaten as flies are by spiders here at home, does not seem so very remarkable—in fact, it is just what one might reasonably expect.

But naturalists, for the most part, are a very unimaginative, sceptical set of men, with whom not to believe a thing, if it is, in the smallest degree, striking or picturesque, is a sort of virtue, in which they hug themselves as long as they can. Accordingly, when Madame Merian and Palisot de Beauvois told them that these large spiders really did eat birds, they all set their faces against it, and were determined not to credit an account derived from the reports of natives, who, of all people in the world, were thought the least likely to know anything about the animals which lived in their own country. It is strange how this idea—or some other one which comes to practically the same thing—prevails. It is as strong to-day as ever, yet in ninety-nine cases out of a hundred what the natives say turns out to be true. At last some European happens to see, once, what they have seen and known all their lives. Then, perhaps, the natives are believed, but only, as it were, in the wake of the one European, who gets more credit for finding they were right than they do for having always told the truth. The one European, in this instance, was Mr. H. W. Bates,

who, in his well-known work *The Naturalist on the River Amazon*, gives the following account of what he saw: "At Cameta I chanced to verify a fact relating to the habits of a large hairy spider of the genus Mygale, in a manner worth recording. The species was *M. avicularia*, or one very closely allied to it. The individual was nearly two inches in length of body, but the legs expanded seven inches, and the entire body and legs were covered with coarse grey and reddish hairs. I was attracted by a movement of the monster, on a tree-trunk; it was close beneath a deep crevice in the tree, across which was stretched a dense, white web. The lower part of the web was broken, and two small birds—finches—were entangled in the pieces; they were about the size of the English siskin, and I judged the two to be male and female. One of them was quite dead, the other lay under the body of the spider, not quite dead, and was smeared with the filthy liquor or saliva, exuded by the monster. I drove away the spider and took the birds, but the second one soon died."

Several spiders have taken to a more or less aquatic life. One of these—the raft-spider—makes, as its name implies, a sort of raft of dry leaves, sticks, etc., which it fastens together by means of its web, and then launches itself on the water, where it is blown about as the wind listeth. When an aquatic insect comes to the surface of the stream, or when a moth or fly falls into it, the spider runs along the water, and seizes it, after which it returns to its raft; or it will run down the stems of the water-plants, and seize what it finds clinging to them, returning

with them, or when it requires a fresh supply of air, as before. If threatened with any danger it crawls underneath its raft, and there remains until all is safe again.

Still more ingenious are the *façons d'agir* of the water-spider, which weaves a nest like a diving-bell against some sub-aquatic plant, and fills it with air from above, by carrying down bubbles that cling to the hairs of its body. It used to be thought that this air had exuded from the stems of the plant itself, and so filled the nest affixed to them, but the naturalist Bell, so long ago as 1856, proved that this was not the case, and that the spider brings down its own air, by experiments, of which he gave the following interesting accounts:—

"No. 1. Placed in an upright cylindrical vessel of water, in which was a rootless plant of Stratiotes, on the afternoon of November 14th. By the morning it had constructed a very perfect oval cell, filled with air, about the size of an acorn, on this it has remained stationary up to the present time.

"No. 2. November 15th. In another vessel, also furnished with Stratiotes, I placed six Argyronetræ (water-spiders). The one now referred to began to weave its beautiful web, about five o'clock in the afternoon. After much preliminary preparation it ascended to the surface, and obtained a bubble of air with which it immediately, and quickly, descended, and the bubble was disengaged from the body and left in connection with the web. As the nest was on one side, in contact with the glass, enclosed in an angle formed by two leaves of the Stratiotes, I could easily observe all its movements. Presently, it ascended

again, and brought down another bubble, which was similarly deposited. In this way no less than fourteen journeys were performed, sometimes two or three very quickly one after another; at other times with a considerable interval between them, during which time the little animal was employed in extending and giving shape to the beautiful transparent bell, getting into it, pushing it out at one place, and amending it at another, and strengthening its attachments to the supports. At length it seemed to be satisfied with its dimensions, when it crept into it, and settled itself to rest, with the head downwards. The cell was now the size and nearly the form of half an acorn cut transversely, the smaller and rounded part being uppermost. . . . The manner," continues Bell, "in which the spider possesses itself of the bubble of air is very curious, and, as far as I know, has never been exactly described. It ascends to the surface slowly, assisted by a thread attached to the leaf or other support, below, and to the surface of the water. As soon as it comes near the surface, it turns with the extremity of the abdomen upwards, and exposes a portion of the body to the air, for an instant, then with a jerk, it snatches, as it were, a bubble of air, which is not only attached to the hairs which cover the abdomen, but is held on by the two hinder legs, which are crossed at an acute angle, near their extremity, this crossing of the legs taking place the instant the bubble is seized. The little creature then descends more rapidly and regains its cell, always by the same route, turns the abdomen within it, and disengages the bubble."

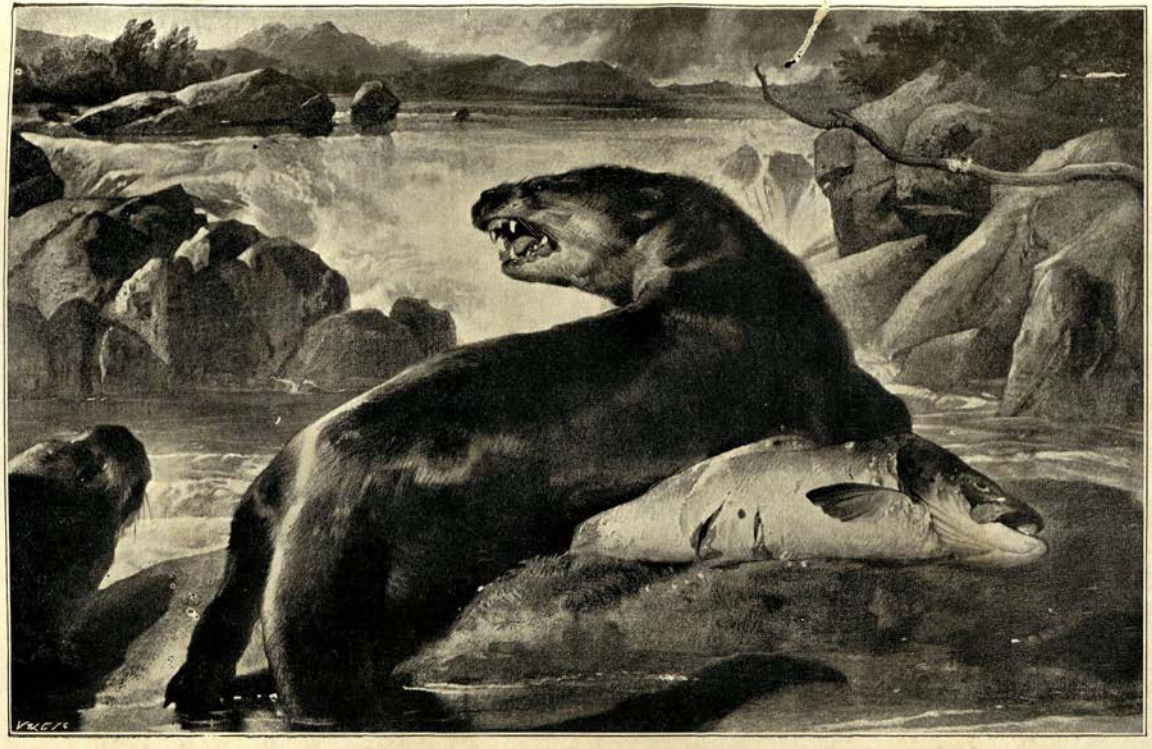
# BORN IN A DIVING-BELL

To its home thus ingeniously constructed the water-spider brings whatever prey it catches. Here too it lays and arranges its eggs, which are in due time hatched, so that, though an air-breathing animal, it is both born and passes the earliest days of its life beneath the surface of the water—a curious apparent, though not a real, contradiction.

## CHAPTER XIV

BEAVERS AND THEIR WORK—THE DAM AND THE POND—PRACTICE WITHOUT PRINCIPLES—A USEFUL TAIL—HOW BEAVERS CUT DOWN TREES.

THE beaver may be said to occupy amongst mammals the place that ants do amongst insects. Wood says of him: "Of the Social Mammalia, he takes the first rank, and is the best possible type of that group. There are other social animals, such as the various marmots and others; but these creatures live independently of each other, and are only drawn together by the attraction of some favourable locality. The beavers, on the other hand, are not only social by dwelling near each other, but by joining in a work which is intended for the benefit of the community." As everyone knows, the beaver is an aquatic animal, as is sufficiently indicated by his appearance. He has a dense, woolly coat, which, as in the case of the otter and the still more water-loving seals, is protected by an outer covering of long, smooth hairs, which are of a reddish brown colour. The toes of the hind feet are webbed, whilst the tail is broadened out into the shape of a paddle, the blade of which, however, lies flat on the water, so that it is not used by the animal as we would use a scull or a paddle, but



OTTER AND SALMON.

with an upward and downward motion. When the beaver moves his tail laterally—that is to say from side to side—as he is very well able to do, it cuts the water, after the manner and with the same effect that a scull does when worked by a seaman at the stern of the boat, instead of in the rowlocks as we use it.

This tail of the beaver is a very wonderful organ, and by far the most conspicuous feature about the animal. The late Mr. Morgan, who made a study of beavers and their habitations, says of it: "It is nearly flat, and covered with horny scales of a lustrous black. These scales, which are such in appearance only, cover every portion of the surface, both above and underneath. Its principal uses are to elevate or depress the head while swimming, to turn the body and vary its direction, and to assist the animal in diving. It is also used to give a signal of alarm to its mates. When alarmed in his pond, particularly at night, he immediately dives, in doing which the posterior part of his body is thrown out of water, and as he descends head foremost, the tail is brought down upon the surface of the water, with a heavy stroke, and deep below it with a plunge. The violence of the blow is shown by the spray, which is thrown up two or three feet high."

Elsewhere the same authority says: "Whilst watching upon their dams at night I have been startled by this tremendous stroke, which, in the stillness of the hour, seemed like a pistol-shot. I have heard it distinctly for half a mile, and think it can be heard twice or three times that distance, under favourable conditions." That

must have been a splendid thing to hear—that sudden, startling blow—in the dead silence of the night, and in the loneliness of the North American wilderness; in the Hudson's Bay territories perhaps—the headquarters of the beaver—where, for hundreds of miles around, there would be no other white man, or even, perhaps, an Indian, within a very great distance. Any other beaver that happened to be about at the time—at any rate, all those that were living in the same pond—when they heard that sound of alarm would go down too in the same way, so that there would be cracks like pistol-shots all about. That would be a concert worth listening to.

But now, what is this pond of the beavers which is referred to by Mr. Morgan in the above passage of his book, *The American Beaver and his Works*—a most interesting work, which should be read by anyone who wants to know all about beavers? It is made, or rather caused, by the beavers themselves, and this brings us to the dam, which is their principal work, and which they construct for the express purpose of having this pond to live in. They are animals who simply cannot do without water, and as the streams on which they take up their abode are often small and shallow, it is of the greatest consequence to them that they should never run dry—which in a drought or dry summer they might easily do. To prevent this, having first selected a part of the stream where the water is not more than two or three feet deep, they bring earth from the adjacent banks and lay it down in mid-stream. Soft earth of a clayey consistency is preferred, for this, penetrated as it is, and

partially held together, by roots and other vegetable fibres, is not at once washed away by the force of the water. The beavers have thus time to add to and strengthen the dam, and the better to effect this object they lay sticks and brushwood upon it, which they then press down into the mud with their feet. To these stones are added, and then more earth and sticks, till at last the crest of the dam appears above the surface of the water, and begins to rise higher and higher. It may attain, at last, to a height of six feet, or even more, above the level of the stream, whilst the length of some dams is as much as two hundred, or even three hundred feet. The stream itself, at the point where the dam intersects it, may only be a few yards in breadth, but as the mass of the flowing water cannot penetrate the solid embankment of mud and sticks which the beavers have made, it broadens out and begins to make a way on either side of it. The beavers, however, to prevent this, keep lengthening the dam, and in this way, as the stream can no longer flow in its channel, and can only get by the obstacle placed in its way, very slowly, by spreading out and flooding the surrounding country, the result is that a great pond or basin of water is formed on the up-stream side of the dam, and this the beavers have all to themselves. Of course, when the water is checked in its flow, it begins to rise against the dam that confines it, and as only a small quantity percolates through, it sinks and runs away in a much smaller volume, on the other side of the obstruction. When a flour-mill, which is to be worked by water-power, is erected by the side of

one of our small streams, exactly the same principle is employed, a dam being built across it, from bank to bank, and the water running off by a side-channel.

Beavers, however, existed long before there were any millers, and moreover, they make better dams than our millers do, or, at least, they construct them upon more scientific principles. The mill-dam runs, as a rule, straight across the stream, but the beavers curve theirs a little up into it, so that the water does not rush against it so violently as it would if it were straight, but flows smoothly off upon either side. This is how we make our sea-dams—at least when it is possible—and where any structure has to resist a great force of water, as, for instance, the buttresses of a bridge across some large river, it is always shaped like this, only more so; that is to say, we turn the curve into an acute angle and present a sharp edge, instead of a rounded surface, to the impetuous rush of the stream. In this way the water is cut in two, as if by a knife-blade, whereas, if the masonry presented a broad surface for it to rush against, the first flood might wash the strongest bridge away. Practical experience seems to have led to the beaver's employment of the principle, though probably he has no very clear ideas as to what the principle is. He could not "formulate it"—as we say—and to say the truth, neither could I myself at this moment

Besides the first, or great dam, the beaver sometimes makes a smaller one lower down the stream. This smaller dam is perhaps a more interesting structure even than the principal one, from the point of view of the

beaver's intelligence. The pond which is formed above it by the now diminished stream, is too small to be of much use to the animal, but by increasing the height of the water behind the great dam, it diminishes the pressure of the stream against it, on the other side, so that there is less fear of its giving way. This, too, is by a principle which I should find it difficult to formulate myself —and it can hardly be supposed that the beaver knows anything about it. The surprising thing is that, somehow, practically, he has found it out—that is to say, he knows how to apply it, without having any idea of what he is doing. In carrying the mud and sticks to the water, the beaver walks, it would seem, upon his hind legs, and in placing and working them together, he generally also assumes the upright attitude. The massive tail, by acting as a base or fulcrum, on which the animal can lean back, enables it to do this with the greatest ease. The toes of the forefeet are not webbed, as are those of the hind ones, nor do they aid in swimming, being then pressed against the body, but are used more as hands, at least for the purposes of architecture. With them the beaver scoops up the mud, and holding it between them or pressed against his throat, walks upright to his dam like a little mannikin in a brown fur coat. It used to be thought that the broad, naked tail served the beaver as a trowel, for the laying and plastering of the mud. This was not so entirely an error as one generally reads it is, since Mr. Morgan tells us that "he uses his tail to pack and compress mud and earth, while constructing a lodge or dam, which he effects by heavy and repeated down-

strokes," and he adds, truly enough, "that it performs, in this respect, a most important office, and one not unlike some of the uses of the trowel." This shows that there was really something in the old idea, but it was imagined also that the beaver, besides using his tail as a trowel, actually prepared mortar with it, from mud. This was a fable, but there was much more truth in the general statement, of which this was only an item, than in the learned *ex cathedrâ* denial, which denied everything—and so it very often is. As we have seen, both wood and mud enter into the construction of the beaver's dam, besides stones, which do not play so important a part. I have called the wood "sticks" because that is the word usually employed in America, where beaver-dams are often called "stick-dams." But these sticks may be of a considerable size, so that we should often rather call them logs, or, at any rate, branches. Branches, gnawed into various lengths, is what they really are, and to obtain them the beaver, which is a rodent, and armed with two enormous chisel-like teeth in each jaw, is accustomed to cut down trees, often of a surprising size, when its own is taken into consideration.

Two or more beavers—according to Mr. Morgan—generally assist in the cutting down of a tree. "Although," he says, "I have not succeeded in witnessing the act, I have obtained the particulars from Indians and trappers who have. The usual number engaged in the work is but two of a pair; but they are sometimes assisted by two or three young beavers. It thus appears to be the separate work of a family, instead of the joint work of several

families. When but two are engaged they work by turns, and alternately stand on the watch, as is the well-known practice of many animals while feeding or at work. When the tree begins to crackle they desist from cutting, which they afterwards continue with caution until it begins to fall, when they plunge into the pond, usually, and wait concealed for a time, as if fearful that the crashing noise of the tree-fall might attract some enemy to the place. The next movement is to cut off the limbs, such as are from two to five and six inches in diameter, and reduce them to a proper length, to be moved to the water and transported thence to the vicinity of their lodges, where they are sunk in a pile as their store of winter provisions. Upon this work the whole family engage with the most persevering industry, and follow it up, night after night, till the work is accomplished."

## CHAPTER XV

BEAVER "LODGES"—PRIMITIVE BEAVERS—INDIAN BEAVER STORIES —AN ARABIAN NATURALIST.

THE last chapter left off just as we were coming to the family life of beavers; so to this and the houses in which they live, with other matters growing therefrom, we will devote the present one. Little round huts is what the houses look like, but in America they are called "lodges"; so, as everything we know about beavers comes from that country, we will use the American word. The "beaver-lodge," then, is shaped something like a beehive, but flatter and broader at the base, and the walls and roof are very thick—from four to five feet, as a general rule, but sometimes even thicker. It is made of a mass of poles and sticks, the shoots and branches of which the beavers gnaw off, and then strip away the bark. They press and interweave them together, and plaster them with mud, much in the same way as they make their dams. They thus become fairly solid structures, but still, as the mud cannot get into all the interstices of the sticks, they are sufficiently porous to answer the purposes of ventilation. Inside, the lodge consists of a circular chamber, the floor of which is formed

of mud, which is soon pressed hard and worn quite smooth by the feet of its occupants.

These consist of a pair of beavers and their young, and sometimes the young of one or more of these, but the Indians say that it is rare to find more than twelve beavers living together, in the same lodge, because the lodge is not large enough to accommodate more than that number comfortably. From two to five young beavers are born at one time, and when they are two years old, by which time they are almost full-grown, they are not allowed to continue any longer in the parent lodge, but have to go out into the world, to find mates and make lodges for themselves. This, at least, is what the Indians say, and no doubt it must be so, in the greater number of cases. Still as a family of five young beavers, with the two parents, would only make seven in all, and as sometimes more than seven beavers are found living together in one lodge, it seems plain that in these cases some of the young beavers must have stayed in the home circle a little longer, and brought their mates there to live with them. Probably the numbers are in accordance with the size of the interior chamber, for if a beaver felt uncomfortable in his lodge, he would, no doubt, leave it, as we should leave our house or lodgings, but without giving any notice. As I say, the floor of the beaver-house is of mud, but round the outer border of it, next to the wall, the beavers lay down grass, which they use, both to sleep on and also to make nests for their young. The latter are nourished, for six weeks, by their mother, after which, and for the rest of their lives, they live principally on

bark. It is not the thick bark, at the base of the trunks of trees, that beavers like, but that which clothes the smaller limbs, for this is both tenderer and more nutritious. This is one great reason for the cutting down of trees, so that the beaver was, no doubt, a tree-feller before he came to be a dam-builder, for food comes first, both with men and animals, and houses and engineering works afterwards.

It might be thought that, as there are trees to be felled both in summer and winter, the beaver, though he does not hibernate, would find no more difficulty in procuring food in the one season than in the other, so that it would not be necessary for him to store up a supply of it, for winter consumption, either in his lodges or at the bottom of his pond. In reality, however, there are difficulties, and "they are compelled," says Mr. Morgan, "to provide a store of subsistence for the long winters of the north during which their ponds are frozen over, and the danger of venturing upon the land is so largely increased as to shut them up, for the most part, in their habitations." Mr. Morgan does not tell us what these dangers are, but no doubt he is referring to various predaceous animals, such as lynxes, pumas, gluttons, and particularly wolves, all of which, by reason of their own difficulties in procuring food, become more ravenous in the winter, and would, no doubt, hail a beaver, away from his lodge, with delight, and hasten to supply his temporary want, with an interior chamber of their own. "In preparing for the winter," Mr. Morgan continues, "their greatest efforts in tree-cutting are made. They commence in the latter part of

September, and continue through October and into November the several employments of cutting and storing their winter food and of repairing their lodges and dams. Part of this winter supply the beaver, as we have seen, brings into his dwelling, and for this purpose he makes a special entrance to it, which facilitates his doing so. Beaver-lodges are always situated on the edge of the water, and it is by diving under water that the beaver goes in and out of them. The lodge enters the water at one point, and, within the space conterminous with it, there are two or more entrances, which open out beneath its surface at a sufficient depth for the water not to be frozen during the winter; since, if this were the case, the inmates would perish, the walls being, at this time, too hard and solid even for a beaver's teeth. These entrances are made," says Mr. Morgan, "with great skill and in the most artistic manner. In new lodges there is generally but one, but others are added, with their increase in size, under the process of repairing, until in large lodges there are sometimes three or four. These entrances are of two kinds, one straight and the other sinuous. The first we shall call 'the wood entrance,' from the beavers' evident design to facilitate the admission into their chamber of the wood-cuttings upon which they subsist, during the season of winter. These cuttings are of such size and length that such an entrance is absolutely necessary for their free admission into the lodge. The other, which we shall call 'the beaver entrance'" (not a very good name, I think, as the wood does not enter by itself) "is the ordinary one for the exit and return of the animal."

As far as I can understand from reading Mr. Morgan's book, the floor of the lodge is extended down, from the point where it touches the water, in a slanting line to the bottom; but whether the wall goes down all the way with it, and whether the entrances run right through the wall or only just underneath it, is not very easy to make out, either from the plates or the description. They apparently come up through the floor of the lodge, though even that is not quite easy to make out from the plates, though these are evidently intended to make things very plain. My own opinion is that nobody will quite know what a beaver-lodge is like, or how its entrances are arranged, until he has seen it for himself.

Some beavers make a trench all round their huts, and let the water from the pond run into it. Then they make one passage out into the water of this trench, and another into that of the pond. Mr. Wood, in speaking of the beaver-lodges, tells us that "they are nearly circular in form, and much resemble the well-known snow-houses of the Esquimaux, being domed, and about half as high as they are wide, the average height being three feet, and the diameter six or seven feet. These are the interior dimensions, the exterior measurement being much greater on account of the great thickness of the walls, which are continually strengthened with mud and branches, so that, during the severe frosts, they are nearly as hard as solid stone. All these precautions, however," he goes on to say, "are useless against the practised skill of the trappers. Even in winter time the beavers are not safe. The hunters strike the ice smartly, and judge by the sound

whether they are near an aperture. As soon as they are satisfied, they cut away the ice and stop up the opening, so that if the beavers should be alarmed they cannot escape into the water. They then proceed to the shore, and by repeated soundings trace the course of the beaver's subterranean passage, which is sometimes eight or ten yards in length, and by watching the various apertures are sure to catch the beavers. This is not a favourite task with the hunters, and is never undertaken as long as they can find any other employment, for the work is very severe, the hardships are great, and the price which they obtain for the skins is now very small." I heartily wish it were nothing, for then this most interesting and intelligent animal would not be in danger of extermination, as I fear it is now.

The greater number of men and women are, unfortunately, quite callous in regard to what is done to wild animals. They do not see that it is a crime to rob a *being* of its life—only a *human* being; though the distinction, nowadays, is one without a difference. To read, first, of what the beavers do, and then of what we do to them, ought to upset one more than the fall of a ministry, or people in one's pew—but it doesn't.

Besides his lodge, or hut, the beaver has his burrow, and there are some beavers which only use their burrows to live in, and do not make a hut at all. The European beaver is now, unfortunately, almost extinct, at least in civilised Europe, but where it does still exist it is not often known to practise house-building. It could hardly have done so in ancient times, since Pliny, the Roman

naturalist, who describes its habits, says nothing about this one. He would have done so, we may be sure, had he known of its existence, and as he was a most eager inquirer, and beavers were common enough in Europe then, he could have had no difficulty in finding out all about them, even if he had not been able to study them for himself. The European beaver, therefore, is in the same state as those American beavers which do not make huts, but just as these latter are exceptional in America, so a few beavers here have been seen making huts, like the American ones. The habit, no doubt, has been gradually evolved, and may have begun by some beavers driving their passages so far through the bank in an upward direction, that at last they broke through the surface, and had to be covered in. It is a curious fact that man, in very early times, lived in caves, and after that made a sort of house underground—a burrow, in fact—so that his habitations may have gone through the same process of development as have those of the beavers—only with him it has been carried a little farther.

Beavers that do not build houses are called by the French-Canadian trappers *paresseux*, or idlers. Such individuals do not make dams either, for they live by large and deep rivers, whose course it would be impossible for them to stem. In the banks of these rivers they make their burrows, and live a more or less solitary life. I have just stated my own views in regard to these primitive animals, but the Indians have another way of accounting for them, which has nothing to do with evolution or development. Their idea is that, after a certain time,

the young beavers are expelled from the family lodge by their parents, who wish them to marry and have children. If, however, they fail to do this, their parents receive them back into the lodge again, but make them, as a punishment, do all the work of repairing the dam. On the following summer they are sent out again to marry, but if again unsuccessful in their wooing, they are not received a second time, but are expelled from the community, and become "outcast beavers." Thus, according to the Indians—and their story is, or was, confirmed by the trappers — there are both outcast beavers and slave-beavers. Ants, as we know, make slaves, and it would be curious if beavers, which so much resemble ants in their social habits, as well as in their great architectural and engineering skill, were to imitate them, also, in this the most remarkable of their institutions. We cannot, with the example of ants before us, say that this is impossible; but no real evidence of it, as far as I know, has been adduced, unless we take the belief of the Indians as such; Indians, like other savages, are close observers of animals, but then, like other savages, they have all sorts of wild legends and fairy-tales about them, as well.

But this fairy-tale of the slave-beavers—if we consider it as such—is told not only by the Indians, but by another and very different people who live right away from them, and whom they could never, in old times, have seen, unless, indeed, the Arabs discovered America. Six or seven hundred years ago, an Arabian author, named Kazwini, wrote a work called the *Wonders of*

*Creation*, and in it he says, "The beaver (kundur) is a land and water animal that is found in the smaller rivers of the country Isa. On the banks of these he builds a house, and in it he makes for himself an elevated place, in the form of a bench; then on the right hand, about a step lower, one for his wife, and, on the left, one for his young ones, and, on the lower part of the house, one for his servants. His dwelling possesses, in the lower part, an egress towards the water, and another higher one towards the land. If, therefore, an enemy comes on the water side, or the water rises, he escapes by the egress leading to the land; but if the enemy comes on the land side, by that which leads to the water. He nourishes himself on the flesh of fishes and the wood of the *chelendech* (? willow). The merchants of that country are able to distinguish the skins of the servants from those of the masters; the former hew the *chelendech* wood for their masters, drag it with their mouths, and break it in pieces with their foreheads, so that, in consequence of this office, the hair of the head falls out on the right and left side. The merchants, who are aware of this fact, recognise in the hair of the forehead, thus rubbed off, the skin of the servant. In the skin of the master this mark of recognition is wanting, as he employs himself with catching fish."

We do not quite know where the "country of Isa" lay, but beavers, at that time, were common not only in Europe, and the more northern parts of Asia—as Siberia—but southwards, in Asia Minor, as well, as far as to the river Euphrates. It is probably the beavers

in these southern parts, which were nearest to his own country, that this Arabian writer was thinking of, and we see that he makes the animal build a house. The probability is that, over such a vast extent of country, the habits of beavers differed a good deal, as perhaps they do now, in the places where they still remain.

## CHAPTER XVI

BEAVER-CANALS AND BEAVER-MEADOWS—ANTIQUITY OF BEAVER-WORKS—BEAVERS AND RAILWAY COMPANIES—WHITE BEAVERS.

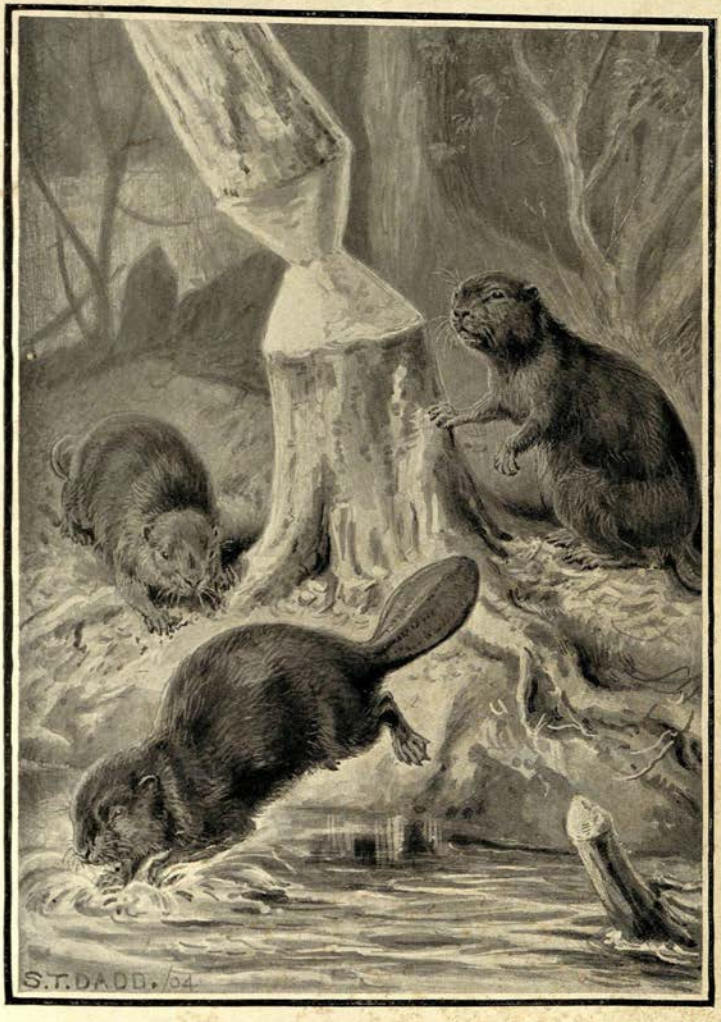
WE have seen the beaver as a dam-maker and a house-builder, but we have not yet considered him as a maker of canals. This we will now proceed to do. In the construction of the dam and lodge, a great quantity of wood is, as we have seen, required, and when the trees do not grow very thickly, those on the edge of the pond are soon cut down and made use of, and gradually, as more and more fall, the beavers have to go farther and farther away from the water, in order to procure fresh timber. To transport this felled timber, overland, to the pond becomes a more and more laborious task, and at last an impossible one, many of the logs made use of being of considerable, or even of great size, when compared with that of the beaver itself. To overcome this difficulty, the beaver sets to work and excavates a trench or cutting in the ground, about three feet wide and as many deep. Commencing it at the brink of the pond, he carries it on to the spot where the trees he covets are growing, and when these, in

their turn, have been cut down, he lengthens it till it reaches others, and so on, following the trees as they gradually recede from the neighbourhood of the pond. Of course the water runs up into the channel thus excavated, so that now, when the beaver has cut up his logs, he has only to float them down the canal that he has so cleverly excavated. This he does by swimming with them in his mouth, or pushing them in front of him with his paws and nose; the water (though there is no current to help) offers very little resistance, and it is now quite an easy matter. Both the trappers and the Indians call these cuttings canals; and canals they are, it is obvious, just as much as those we make for barges to ply on. According to the size of the pond, and the scarcity or otherwise of the trees near its banks, will be the number of the canals made from it by the beavers. A pond figured in Mr. Morgan's book has five, at different points, all round it, and some might have a great many more. It is wonderful the length to which some of these canals extend. One that Mr. Morgan speaks of was close on six hundred feet, and there are some that are longer.

Beavers live together, not in large numbers, as used to be supposed, but two or three families in the same pond. Such ponds, however, continue to be inhabited by the descendants of such families, from generation to generation, and as the dams are always being repaired and extended by them, and the canals lengthened, they at last become works of considerable magnitude. No one who first saw one of these great, ancient beaver-dams would

suppose it to be the work of comparatively small animals, or, indeed, of any animal at all, except man. As for the canals, their banks soon become covered with moss and vegetation, so that they look like natural sluggish streams, oozing through the flat, marshy land. Mr. Morgan, speaking of them, says: "When I first came upon these canals, and found they were christened with this name, both by Indians and trappers, I doubted their artificial character, and supposed them referable to springs as their producing cause; but their form, location, and evident object showed conclusively that they were beaver excavations."

Again, in considering these wonderful works of a quadruped from the point of view of the intelligence required for their production, the same writer says: "In the excavations of artificial canals, as a means for transporting their wood by water to their lodges, we discover, as it seems to me, the highest act of intelligence and knowledge performed by beavers. Remarkable as the dam may well be considered, from its structure and objects, it scarcely surpasses, if it may be said to equal, these waterways, here called canals, which are executed through the low lands bordering their ponds, for the purpose of reaching the hard wood, and of affording a channel for its transportation to their lodges. To conceive and execute such a design presupposes a more complicated and extended process of reasoning than that required for the construction of a dam, and although a much simpler work to perform, when the thought was




BEAVERS TREE FELLING.

When the tree is about to fall the beavers make a dash for the water to escape the unwelcome attentions of their foes, which will be attracted to the spot by the crash of the falling tree.

fully developed, it was far less to have been expected from a mute animal." However, I am not sure that I follow Mr. Morgan here. To make a dam must have required as much intelligence as to make a canal, if we suppose that the beaver first said to itself, "I will put an obstacle in the way of the stream, and thus by checking the flow of the water, and causing it to flood its banks, I shall have a nice large pond to live and play in." That, surely, would have been just as clever as for it to have said or thought, "I will make a waterway from the pond to the trees, and then I shall be able to float my logs down by water instead of having to drag them over the land."

But I think myself that the beaver never had either of these ideas in its mind—at least not at first—but that it found out by a lot of little accidents—or, as we say, through practice—the advantages of both proceedings, and then acted accordingly. I see, for instance, in the plates which Mr. Morgan gives of the beaver-ponds, with the canals running out of them, that there are some little waterways which are not marked as canals. These, I suppose, must be meant to be natural, and whether they are or not, it is almost certain that there would be some shallow and elongated depressions in the ground round the pond, into which the water in it would run. It would be quite natural for the beaver to take advantage of these, and, in pulling large logs of wood into them, he would have found that they moved more easily when the ground near these little channels was muddy and sloppy.

But simply by pulling and tugging at them there, he would have been making the ground muddier and sloppier, and so, having found out, by accident, the good he was doing, he might have gone on doing it on purpose, and thus, little by little, have got to making a canal. Now, perhaps, he knows exactly what he makes it for, and works just as one of our own engineers would, but even of this we cannot be quite sure. However, this is a book about facts, so I will leave these speculative questions for someone else (or for nobody) to decide.

There is one other thing that the beavers make, besides their dams, their lodges, and their canals, and that is their meadows; but beaver-meadows, as they are called, are not the result of design on the part of the animal, but only the necessary consequence of its actions in other respects. Their appearance, and the way in which they are caused, are thus described by Mr. Morgan: "Where dams are constructed," he tells us, "the waters first destroy the timber within the area covered by the ponds. When the adjacent lands are low, they are occasionally overflowed after heavy rains, and are at all times saturated with water from the ponds. In course of time the trees within the area affected are totally destroyed; and in their place a rank, luxuriant grass springs up. A level meadow, in the strict and proper sense of the term, is thus formed; although much unlike the meadow of the cultivated farm. At a distance they appear to be level and smooth; but when you attempt to walk over them, they are found to be a series of hummocks, formed of

earth and a mass of coarse roots of grass rising about a foot high, while around each of them there is a narrow strip of bare and sunken ground. The bare spaces, which are but a few inches wide, have the appearance of innumerable watercourses, and through them the water passes when the meadows are overflowed."

These meadows, though not designed by the beavers, are yet useful to them, for, as Mr. Morgan says: "In addition to the nutriment which the roots of these grasses afford to the beavers, the meadows themselves are clearings in the wilderness, by means of which the light as well as the heat of the sun is let in upon their lodges." Of course, when land that was once dry becomes overflowed with water, when peculiar-looking meadows appear, that were not there before, when canals wind about through them, and when trees that were formerly abundant grow thinner or even disappear, a considerable change takes place in the appearance of the country; and so numerous, till lately, were beavers in North America, that a very large extent of territory may be said to be the work, not, indeed, of their hands, but of their paws and teeth. Sometimes the Indians have been alarmed at the number of trees cut down by these animals, thinking they would not have sufficient fuel for their own encampments, but here, I think, they must have feared without cause, since beavers and trees have both been plentiful in the country from time immemorial.

On one occasion, however, by making a dam across a small stream running parallel with one of the principal railway lines of Canada, the beavers produced an

accumulation of water against the railway embankment. As it was feared that the line might be flooded, or the earth supporting it weakened, with possible disastrous consequences, a cutting was made through the centre of the dam, thus lowering the water to its original level. The beavers, however, were accustomed to repairing their dams, and did so in this instance. The company again cut the dam, the beavers again repaired it, and this conflict between an animal and one of the chief commercial enterprises of the country continued, till the dam, having been fifteen times cut through, was at length abandoned by its architects. This shows, certainly, great perseverance on the part of the beavers, but it shows also that they are capable of learning by experience. Why the dam should be always cut through, they could not, probably, conceive, and experience had hitherto taught them that the proper way of dealing with a breach was by repairing it. It now taught them that there were some breaches which it was no good to repair, and perhaps it took them no longer to learn, or, rather, to infer this, than, under similar circumstances, it would have taken ourselves. A general will often try many assaults upon a fortified place before he comes to the conclusion that it is too strong to be taken.

As has been mentioned before, incidentally, the beaver belongs to the order of rodents or gnawing animals, of which our most familiar examples are the rat and the mouse. He is the second largest animal of the order, the first being the great capybara of South America, which creature weighs as much as 90 or even 100 lbs. The

beaver, when full grown, may weigh as much as 50, but it is rare for one to attain this size. Though usually of a reddish brown, black beavers are sometimes met with, and white ones, though extremely rare, are not absolutely unknown. Traherne in his *Journey to the Northern Ocean* says: "In the course of twenty years' experience in the countries about Hudson's Bay, though I have travelled six hundred miles to the west of the sea-coast, I never saw but one white beaver-skin, and it had many reddish and brown hairs along the ridge of the back. The sides and the belly were of a glossy, silvery white." Prince Maximilian, too, who also travelled in North America, says that he "saw one beautifully spotted with white," and that "yellowish white and pure white ones are not unfrequently caught on the Yellowstone." This, however, was a long time ago. Not only white beavers, but brown ones too are getting rare now.

Beavers are nocturnal, so that it is not so easy to see them working at their dams and lodges as it might otherwise be. However, it would not be very easy, even if they worked in the day, for persecution has made them extremely shy and wary, and perhaps has even had something to do with their habits in this respect. On land the beaver is somewhat awkward, and not at all fast, so that, though he is able to gallop, an ordinary dog could soon run him down. The water is his more natural element, and here he is easy and graceful. His sight, at least in the daytime, is not very good, but his smell and his hearing are most acute. Upon the latter sense he relies so much that he will often choose out some little

hillock or rising piece of ground, where he will sit up on his hind legs like a sentinel, listening attentively. Then, says Mr. Morgan, his best biographer, "he will retire, but only to return at intervals, and repeat the observation until satisfied whether or not danger is near." With this interesting trait we will take our leave of this most interesting and badly treated animal.

## CHAPTER XVII

SEALS AND THEIR WAYS—BREEDING HABITS OF THE SEA-BEAR—SEA-ELEPHANTS—THE WALRUS AND THE POLAR BEAR—MATERNAL AFFECTION UTILISED—A WINTER SLEEP IN A SNOW-HOUSE—A DANGEROUS INTRUSION—BREAKFAST WITH AN ALLIGATOR—THE CROCODILE AND THE TROCHILUS.

IF the beaver has been to some extent structurally modified in relation to its water-loving habits, we have in the seals a group of marine carnivorous animals whose ancestors, as we plainly see, must at one time have been terrestrial, but whose limbs and bodies have become almost entirely adapted for an aquatic existence, and who are never found far from the vicinity of the water. They lie, however, on the rocks or ice to rest, and at certain seasons of the year repair to remote, but, unfortunately, not inaccessible islands, for the purpose of bringing forth their young. Seals are most numerous in the arctic and antarctic regions, and to render them impervious to the great cold of these latitudes their bodies are covered with a thick, dense fur, which, as with the beaver, is of two kinds, forming an upper and an under coating. The under fur of some species is very much sought after, and to obtain it, vast multitudes of these poor animals are, every year, slaughtered under circumstances of great barbarity. As the value of sealskin is far more artificial than real, inas-

much as there are few ladies who could not be quite warm enough without wearing it, it is to be hoped that as they become aware that almost every jacket represents a seal that has been skinned alive, they will cease to make these cruel purchases, and thus save millions of innocent and interesting creatures from perishing off the face of the earth.

These fur-bearing seals—or sea-bears as they are called—are polygamous, and their breeding habits when assembled on their far-off island nurseries are very curious and interesting. The male sea-bears—or bulls as they are called—are very much larger than the females—in fact, they weigh almost six times as much. They are, therefore, able to seize them in their teeth, and lift them about almost as easily as a cat does its kittens, and each bull gets for himself, in this way, as many females or cows as he can, and guards them on a certain spot of ground, which he looks upon as his own, and from which he never stirs. If he were to stir from it he would be attacked by some of the bulls round about, into whose territory he would have to intrude—for they are all packed very closely together. Each bull does his best to keep his harem of cows to himself, but they all try to steal from each other's harems, and thus fights between the bulls are continually taking place. They bite fiercely at one another, and the whole air is full of the loud, harsh roarings which they utter. Sometimes two males will each seize hold of the same female, and then they both pull and tug at her, until sometimes—as neither will relax his hold—the poor animal is almost torn in half. The bulls

fight most on first landing on the island, and before the harems have been got together by them. Afterwards things grow quieter, but each bull is continually occupied in guarding his harem.

One of the most interesting accounts of the breeding habits of the fur-seal is given by a Mr. Elliott, who spent a long time at their breeding stations, off the northern coasts of Alaska. He says: "It appears to be a well-understood principle among the able-bodied bulls that each one shall remain undisturbed on his ground, which is, usually, about ten feet square, provided he is strong enough to hold it against all comers; for the crowding in of fresh bulls often causes the removal of many of those who, though equally able-bodied, at first, have exhausted themselves by fighting earlier, and are driven, by the fresher animals, back farther and higher up on the rookery" ("rookeries" is the name given to these seal-breeding stations, though it does not appear to me to be a very good one). "Some of these bulls," continues Mr. Elliott, "show wonderful strength and courage. I have marked one veteran who was among the first to take up his position, and that on the water-line, where, at least, fifty or sixty desperate battles were fought victoriously by him with nearly as many different seals, who coveted his position, and when the fighting season was over, I saw him covered with scars and gashes, an eye gouged out, but lording it bravely over his harem of fifteen or twenty cows, all huddled together on the same spot he had first chosen."

As to the fighting itself, Mr. Elliott says it "is mostly

or entirely done with the mouth, the opponents seizing each other with the teeth, and clenching the jaws. Nothing but sheer strength can shake them loose, and that effort almost always leaves an ugly wound, the sharp canines tearing out deep gutters in the skin and blubber, or shredding the flippers into ribbon-strips. They usually approach each other with averted heads and a great many false passes, before either one or the other takes the initiative by gripping; their heads are darted out and back as quick as a flash; their hoarse roaring and shrill, piping whistle never ceases, whilst their fat bodies writhe and swell with exertion and rage, fur flying in air and blood streaming down—all combined make a picture fierce and savage enough, and, from its great novelty, exceedingly strange at first sight." Sooner or later one of the two combatants proves stronger than the other, and when this becomes sufficiently apparent, the weaker of the two withdraws. Instead of pursuing him, as might have been expected, the victorious bull stays where he was, fans himself with one of his hind flippers, as though so much exertion had made him hot, and, with a satisfied chuckle, seems to rejoice in his victory.

An older writer who visited the islands more than 170 years ago, and who calls the sea-bears sea-cats, says: "When two of them only fight, the battle lasts frequently for an hour. Sometimes they rest awhile, lying by one another; then both rise at once, and renew the engagement. They fight with their heads erect, and turn them aside from one another's stroke. So long as their strength is equal, they fight with their fore paws; but

when one of them becomes weak, the other seizes him with his teeth, and throws him upon the ground. When the lookers-on see this, they come to the assistance of the vanquished. The wounds they make with their teeth are as deep as those made with a sabre; and in the month of July you will hardly see one of them that has not some wound upon him. After the end of the battle they throw themselves into the water to wash their bodies." This account differs in some particulars from that of Mr. Elliott, who says nothing about the seals fighting with their flippers or entering the water afterwards. The latter hardly seems likely, as the females would be then left unguarded; but perhaps the actions of the seals differ a little, according as it is early or late in the season. This latter informant, who was a Russian, tells us that the females who may be present at such conflicts always follow the victor. At the time when he lived, these poor sea-bears were not persecuted in the way they are now. People hardly ever went to their breeding islands then. It is pleasanter to think of these strange, fierce battles raging amidst ice and snow, in the far-off lonely regions of the north, without anyone to see or interfere with them, than amidst human surroundings of not at all a pleasant character—for the men who skin the seals alive for ladies are amongst the most brutal and debased of mankind. There is always more of the romance of natural history when animals are not interfered with.

The fur-bearing seal is only one of many species belonging to the family. Some of them are very large animals, the largest being the great elephant-seal or sea-

elephant, a creature which sometimes measures as much as thirty feet in length, and fifteen or eighteen feet round the largest part of the body, so that it is much larger and heavier than the real elephant. They are polygamous, like the animals we have just been speaking about; and it must be a still more wonderful thing to see such huge creatures fighting. This the males do with the greatest fury; but the first descriptive word upon our title-page receives a better illustration in the love and devotion which they show towards the females. They will not desert them when they are in any danger, and this fact, so much to their credit, is taken advantage of by the brutal seal-hunters, who attack the females first, and the males, who remain with them, afterwards. Were they to reverse the process of destruction, the harem belonging to any male that was killed would immediately take to the sea and disappear. Whilst he lives, however, they connect their safety with his presence, and so continue to crowd about him until he breathes his last. My authority for this statement is the Rev. J. G. Wood, but I have not been able to find anything bearing upon it in the accounts of those having personal experience of the habits of these animals, which I should have liked to have done. If true, then we have here a striking instance of affectionate solicitude in an animal, as contrasted with that callousness and deadness of sympathy on the part of man, which the slaughter of beasts always and necessarily produces.

The sea-elephant is enormously fat, and the boiling of its fat down into oil, with the subsequent sale of this, is

the industry with which its slaughter is connected. Some time ago this industry was not known, and some years hence it will have ceased with the life of the species. The world, therefore, will have gained nothing permanently by the oil, whereas it will have lost for ever an interesting and wonderful creature. The sea-elephant is a denizen of the southern seas, and used once to be very plentiful on the coast of California and Mexico. Now, however, owing to the persecution to which it has been subjected, one is scarcely ever to be seen there.

Next, perhaps, to the sea-elephant in size, comes the great morse, or walrus, of the arctic and antarctic oceans. The principal peculiarity of this huge seal—the sea-horse as it is sometimes called—is the pair of long tusks, reminding one of those of an elephant, which it carries in its upper jaw. The length of these tusks is about a foot, and sometimes they weigh ten pounds apiece. The Esquimaux use them in the making of fish-hooks—for the fish-hooks of all savages are very different-looking articles to our own, and made in a very different way, though the principle is the same. But what does the walrus itself use them for? Wielded by an animal of such vast size and strength, they must, no doubt, be formidable weapons of offence, but they cannot be used to give a direct thrust forward, as the elephant uses his tusks, since they hang down from the jaw instead of projecting horizontally beyond it. Were one male walrus, however, to succeed in rearing his head over the neck or shoulder of another, he could inflict, it is evident, a formidable wound by stabbing downwards with his two

curved ivory stilettoes. It would seem, however, that it is mostly as an aid to the procuring of its food that the walrus uses its great tusks. With them it digs and scrapes amongst the sand and shingle on the bottom of the sea, along the coast, thus stirring up various molluscs and crustaceans, on which it principally feeds. In climbing up upon the rocks or slippery shores, too, it finds its tusks useful to hook on with, as has been related by various eye-witnesses and denied by various professors.

The regions where the walrus dwells are equally the abode of the white, or polar, bear, and it is possible that these two great creatures sometimes come into collision. Not that the walrus would ever interfere with the bear, but, in spite of its size, the converse may sometimes be the case, when the latter is pressed by hunger. In such an encounter I should think, myself, that the walrus would have the best of it. With his thick skin and still thicker blubber underneath it, he could hardly be very much injured by the teeth and claws of the bear, whereas a dig of his own tusks might well put the latter *hors de combat*, or even terminate his existence. For large and strong as a polar bear is—and he exceeds even the grizzly in size—he is inferior in both these particulars to the vast bulk and huge, though unwieldy, strength of the walrus. Doubtless he is aware of this fact, nor have I ever heard of such a combat being witnessed. Still, as I say, it might occur, and then what a sight it would be! What mighty blows and buffets! what horrible growlings and roarings! —the bear, no doubt, reared on its hind legs, striving to tear at the throat or neck of the walrus as the most

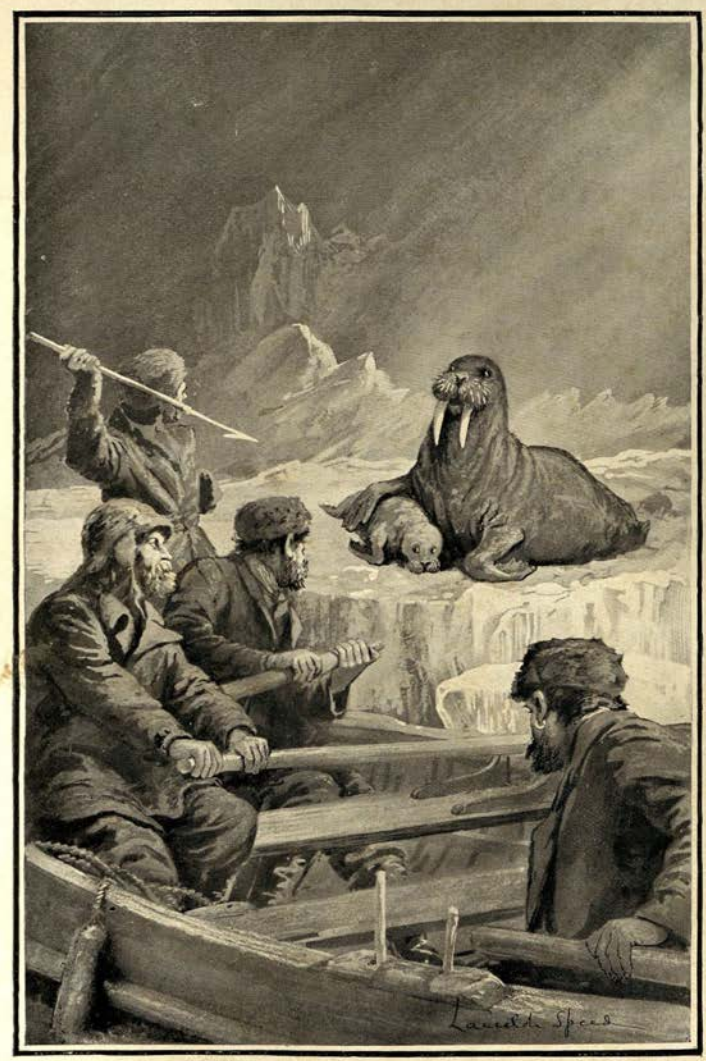
vulnerable part. The great seal, however, swinging its huge head from side to side, would shake off, each time, the grasp of its shaggy assailant, and at length seizing an opportunity to which the methods of the latter would perhaps have contributed, might transfix his neck or shoulder with a terrific downstroke of its tusks; crushing him at the same time on to the ice or hardened snow, now all bloodstained with the conflict. But we will not pursue further an imaginary picture.

But though they can defend themselves when the necessity arises, walruses are not of a combative disposition. They go in herds, the members of which are much attached to each other, so that an attack upon any one arouses the resentment, and may even provoke the retaliation, of the rest. When tamed, too, walruses have shown themselves as affectionate towards human beings as any dog could be. One brought alive from Archangel to St. Petersburg, in 1829, became deeply attached to its keeper—a lady, Madame Dennebecq by name.

One might expect that an animal thus capable of forming friendships would also show great parental affection. Accordingly we find this quality highly developed in the walrus, and the usual sportsman has given the usual account of how he witnessed it. A female, in this case, being wounded, placed her right fore fin or flipper about the body of her young calf, and endeavoured to shield it from the harpoon, against which its years were no protection, by the constant interposition of her own body. The terror of the calf, with the look of anxiety upon the mother's face, accompanied with a reckless disregard of

her own danger, were, we are told, most affecting, but did not, unfortunately, affect the result, both the poor animals being slaughtered. Walrus-hunters do not often let their feelings get the better of them, they prefer to get the better of the walruses, through *their* feelings, which are tenderer. Thus, having caught a young one, they induce it to grunt, when the herd come to its assistance and are shot or harpooned.

It is, however, to its habit of going in herds that the walrus owes much of its safety. Even though half famished, a polar bear would hardly venture to attack one—even if only a young one—under these circumstances. Indeed, though so large an animal, the polar bear contents himself, for the most part, with the smaller kinds of seals, which he catches when they are asleep on the ice—perhaps, sometimes, even in the sea: for he is a wonderful swimmer, though not shaped quite so much like a fish as is a seal, and with feet only, and not flippers, to swim with. So much is said about the great size and strength of the grizzly bear that one might think it was the largest of all the bear family, but this is not the case. The largest of all bears are the polar bears, and this proves that they get quite enough to eat, even though they live in the cold, bleak north, where there are no great forests full of birds and monkeys and all manner of creatures; no plains or prairies with antelopes, or bisons, or herds of wild horses or zebras bounding over them, but only desolate icefields or dreary wastes of snow. Life, indeed, in the far north or south, is poor in species, but it is—or, at least, it was, until civilised man



A BRAVE MOTHER.

The wounded walrus endeavoured recklessly to protect her young calf from the harpoon.

came there to make it a solitude indeed—abundant in individuals. The ice has its own herds in the shape of numberless seals that lie upon it asleep or resting, enjoying what sun there is, during the short summer. Even in the winter, as these creatures must have air to breathe, they are accustomed to come out of the sea through holes in the ice, which they manage to keep open by constantly coming up in the same place, and so always breaking the ice, before it has time to get thick. The polar bears watch at these seal-holes, as they are called, and seize the seals as they come up, or else they wait till they have crawled out, and stalk them as they lie asleep.

In this way the male polar bear, at any rate, seems able to keep himself in food during the winter, but the female is said to hibernate, and this she does in a very interesting and peculiar way. Where it is all ice and snow, there are no caves for her to retire into, but she makes a cave by utilising the materials around her in the simplest possible way. She simply lies down in a snowstorm, and lets all the rest take care of itself. Her weight presses down the soft snow she is lying on, and she is soon covered up by the flakes falling upon her. She now lies in a little cave, for, by moving and rolling, she presses the snow away from her back and sides, so that she has a comfortable space, and does not feel cramped and confined. If it were earth that had been flung over her, she would be pressed down by its weight and soon suffocated, but it is different with the soft yielding snow. Neither is she cold, for the heat from her body warms the little cave that she lies in, just as if she were a stove; and as the hot breath

from her nostrils rises up, it thaws the snow just above them, and makes a hole by which it escapes, and through which she is able to breathe. Here, then, in her little vaulted chamber, with its breathing-hole in the ceiling, the she polar bear lies snugly asleep, all through the cold, dark winter, and when the summer comes and the sun begins to melt the snow, out she gets, with a good appetite, all ready to catch a seal.

I am not sure if the winter sleep of the polar bear is a heavy or a light one, or whether the Esquimaux, who live in these arctic regions, are bold enough to interfere with it if they happen to come upon its sleeping-place. The brown bear of Siberia, however, is sometimes attacked whilst hibernating, and this is a very dangerous thing to do, for this species—unlike the black bear of America—sleeps lightly, and is very fierce when disturbed. The way employed is for one man to descend into the bear's cave, at the end of a rope, the other end being held by two or three men, who stand at the cave's mouth. The man who goes in has a torch, or a candle, fixed into his cap—at least I think I have somewhere read this account—so that he can both see before him, and carry his gun in both hands. When he sees the bear lying asleep he creeps cautiously up, and putting the muzzle of his gun against the side of the animal's head, pulls the trigger. As soon as the men outside hear the roar of the gun in the cave, they pull on the rope, and the assassin starts running at the same time. If he stumbles or falls, he is pulled along the ground, and in this way may avoid the rush of the bear, supposing the shot has not killed it.

If the muzzle of the gun has been well placed, it ought, of course, to be a certain thing, but the bear may wake first, or move just at the critical moment, or it may be difficult, in the dark cavern, only dimly illumined by the flickering light of the candle, to see in what position it is lying. All this has to be risked. Still, on the whole, the chances are a good deal against the bear, and if its cavern —or hibernaculum, to use the technical word—is once found, it is pretty sure to be killed, even though it may, sometimes, kill a man or two first. I forget, now, exactly where I have read this account, but it was in a trustworthy book, I feel sure, so I hope it is correct in the main, even though I may have forgotten some of the particulars.

Bears are the largest animals that hibernate, unless some very big crocodiles or alligators may be considered to be larger still; and, perhaps, as these giants attain a length of twenty or even thirty feet, they may weigh as much or more. These creatures generally sleep in holes under the river-bank, but the alligator of tropical America will, sometimes, bury itself in the mud of a swamp, which may then dry up altogether, so that an encampment, or even a hut, may be raised upon it. In time the rains fall, the ground begins to grow moist again, and someone lying in his hammock, or just sitting down to breakfast, may be startled, all at once, by a great alligator rising up beneath him, out of the mud that makes the floor of his hut.

It is not this alligator, but the crocodile of Egypt and the Nile, that has long been famous for its friendship with a little bird, which, when he lies on the shore, may

be seen not only running all about his body, but sometimes even inside his mouth, which the reptile holds purposely open for him. One snap of the great jaws, and the bird would never more be seen, but this snap is never made. The reason is that the bird is of great service to the crocodile, by freeing it from certain small animals which fix themselves on its body, or even within its jaws. On the other hand, the bird is very glad to get these creatures to eat, so that the friendship on both sides is based upon utilitarian principles. Herodotus, who visited Egypt over 2,000 years ago, relates as follows concerning this intimacy: "It is blind in the water (!) but very quick-sighted on land; and because it lives for the most part in the water, its mouth is filled with leeches. All other birds and beasts avoid him, but he is at peace with the trochilus because he receives benefit from that bird. For when the crocodile gets out of the water on land, and then opens its jaws, which it does, most commonly, towards the west, the trochilus enters its mouth and swallows the leeches: the crocodile is so well pleased with this service that it never hurts the trochilus."

## CHAPTER XVIII

CROCODILES AND ALLIGATORS—DECEPTIVE APPEARANCES—AN UNFORTUNATE PECCARY—AN AMBUSH BY THE RIVER—LIFE AND DEATH STRUGGLES.

THE most interesting thing I know about crocodiles and alligators—and this is a remark which applies to a good many animals—is the way in which they procure their food. This they do mostly, and by preference, in the water, but they have, also, a habit of lying in wait upon the mud of river-banks, until some animal approaches sufficiently near to be within their reach. Lying sunk in the mud, and of the colour of mud themselves, they may well be mistaken for a log or drifted tree-trunk, for they make no movement, and seem to be quite inanimate. Only their eye, if one happens to catch it, proclaims that they draw the breath of life. A wild pig, or some other animal fond of rooting in the mud, sees the long, black, shapeless object, and bestows upon it, at first, a scrutinising glance. "Looks like a log," is probably its internal comment; "still, from time to time, I'll keep my eye upon it." It does so, but as the supposed log is always precisely in the same place and position, it becomes strengthened in its first conclusion, and soon ceases to think anything more about it. By this, in the course of grubbing and grazing—for there may be reed-

beds, or other delectable patches, scattered about over the mud—our pig—one of a scattered herd—has got somewhat nearer to the long, dark object, and with occasional deviations and wanderings away into safety, continues, on the whole, to get nearer still. It is by mere chance that he does so. There is no need to, any other direction would do as well, but fate is upon him, he is the foredoomed one, the "one more unfortunate," the one to "be taken" amidst the many to "be left"—some for another time. Looking up, suddenly, with the fresh-turned mud upon his nose, he is surprised to see the log right beside him, so near that he might jump on the top of it, were he so minded, and—and by the jaguars!—he *is* so minded. He will do it, he has run down logs before, he rather likes it; sometimes, too, by ripping up the bark one may get at something—that upon a log which he thought, not long ago, in his overwariness, might get at him. The recollection gives piquancy to the situation. He brings all four legs together, and rises in a light, elastic spring. In the very moment of doing so—a second or so before, perhaps, but the motion cannot be arrested now—he notices that a change has come over the supposed log. It has moved; nay, it is moving. One end of it, the longest, thinnest end, the tail end—oh, heavens! *the tail*—is gliding away in a curve, till now its tip almost touches the further side, not of a log, but of a gigantic alligator, whose head, with grinning jaws, is at the same time raised, and whose greeny, baleful eye, falling, like death, upon the deceived animal, seems to claim him for its own.

What can he do? All too late the fraud is revealed to him; no log, but a cruel saurian that has, all along, been waiting for its prey. What can he do now?—poor miserable, cheated pig, so happy but a moment before, and now—— He would stop himself if he could, but he is in mid-air and cannot check the impetus. On he must; but even so—even in mid-air thought may be active. Our pig's brain is working. He has escaped from as great a danger. He remembers that time with the jaguar. Courage! even now. Come down on the alligator's back, that he must do, but the instant he touches it he will spring lightly up again, and far away on the other side. Then—there is hope yet. One more spring, a race, and a scamper, and—— But the tail of the alligator is by this time bent round as tight as it will go—it has not taken long—and suddenly, like a bow when the arrow is loosed, it flies back, and then with a mighty swing comes round in the opposite direction. It meets the flying body of the pig, not directly, but with a tremendous sideway blow; there is a heavy, dull sound, a squeal, choked suddenly as for want of breath, and hurled obliquely from its original course, the luckless and now almost inanimate creature falls in a dead heap, some yards beyond the saurian's head. Recovery from such a blow would be in any case doubtful, but the pig has no time to recover. With a sudden, swift rush the alligator is upon him, and seizing the body by the skin, which it holds puckered up between its front teeth, it shakes it furiously, as a terrier would a rat, and then half drags, half pushes it before it, as it crawls through

the mud, to the water's edge. The herd, alarmed by the sudden commotion, yet scarcely knowing what has happened, scatter at first, then rush all together and stand still, gazing from a safe distance at the suddenly revealed monster. Then, lowering their heads and whisking their tails in the air, they dash in wild gallop from the scene of the catastrophe.

The pig that has thus fallen a victim is most likely to have been the little South American peccary, for this habit of lying in wait upon the actual shore, and then striking suddenly with the tail, seems more developed in the American alligators than in the crocodiles of the Old World. The force of such a blow, when delivered by an alligator of any size, is tremendous, sufficient, says somebody, writing to one of the papers, to break the leg of an ox like a pipe-stem. According to this account, one of the fierce bulls, common in Florida, was attacked by an alligator, and his bellowings brought four other bulls to his assistance. Two, if I remember, had their fore or hind legs broken, but the other three succeeded, between them, in goring their enemy to death. It was an exciting story. I cut it out, and still keep it somewhere—I would quote from it if I knew where. As it is, it would take me a long time to find again, even if I knew in what paper to look for it, for though I think it was in the *Field* I am not quite sure—it was several years ago. However, there was nothing in it which seemed to me at all impossible, or even unlikely. I am not quite sure, now, how the fight began. It would seem as if the bulls must have found the

alligator some way from the water, or probably he would have succeeded in throwing himself into it. Perhaps the bulls attacked him first, or perhaps he served the first one in the same way that that other alligator did the pig.

The more usual plan, however, adopted by these great amphibious reptiles for seizing their prey, is to lie just under the bank, in the water, with only their eyes and the breathing-holes of their nostrils above it, so that they are quite invisible amidst the sedge or rushes, which commonly fringe the shore. If an animal—an ox for instance—comes down to drink where they lie—and they are clever enough to select a good drinking-place—they spring up and seize it by the muzzle, and then, joining their strength to their weight, and with some powerful backward strokes of the tail, in the water, they endeavour to overbalance it, and make it topple down the bank. Whether they are successful, or not, will depend on the size and strength of the animal thus seized, and still more on how much it may be taken at a disadvantage. A powerful ox or a buffalo—except, perhaps, the giraffe, the two largest animals that are at all likely to be attacked—will, often, drag its assailant up the bank, retreating backwards, and succeed, at last, in getting free from the terrible jaws. But should it stumble, or make a false step, which is very likely, the chances will be greatly against it. Its own weight adds, now, to the drag of the crocodile upon it; it slides or rolls down the incline, and, once in the water, all is soon over—it is dragged beneath the surface and drowned.

All the crocodile family are hatched from eggs, and although the parent is so large—perhaps twenty or thirty feet long—the eggs it lays are no larger than those of a goose. Consequently, the young crocodiles and alligators, in spite of their great mothers who try to look after them, are preyed upon and devoured by a great number of creatures, birds, fishes, various mammals, and even sometimes their own fathers. But when they become large and strong, there is only one wild animal I know of that cares to interfere with them, and that is the savage jaguar of South America. How large an alligator has to get before the jaguar is afraid to attack it, I do not know, but as Mr. Bates disturbed the creature at his meal on one, which, he thought, had left the water to lay its eggs, I suppose it was a fair size. Why Mr. Bates does not, himself, tell us how large it was, and why he says nothing more upon such an interesting subject—only just that he frightened the jaguar and found the remains of the alligator—I really don't know; but it is an irritating way which travellers sometimes have. They generally go on to talk of something not nearly so interesting, and never turn back to what you would like to hear more about. This particular alligator had left the river-bank, and crawled up into the forest which was some distance away from it. This would have given the jaguar a great advantage, and perhaps it is only under such circumstances that even he would venture to attack an alligator of any size, since, if the latter could get to the water, all his efforts would be in vain.

When the jaguar attacks the alligator, he is said to spring on its back, and then tear, with all his might, at the root of its tail. This, possibly, is with the idea of paralysing that member, thus rendering it incapable of those mighty sweeps from side to side which are more, almost, to be feared than even the great armed jaws. The fear of both these weapons may deter the jaguar from clawing the throat of the saurian, for were it to be jerked off in the latter's struggles, it would be more exposed to either than if it fell farther back. But why not disembowel the creature, since that could be done—or attempted—from almost equally far down the back? However, as far as I am aware, we have no real evidence as to the *modus operandi* employed by the jaguar on these occasions, nor do I know anyone who has come nearer to witnessing such a scene than Mr. Bates, who, however, was just too late.

Besides alligators, the jaguar, like the common cat, is fond of a meal of fish, but unlike "the poor cat i' the adage," he is not afraid of wetting his paws to get it. Such, at least, is the story told by both natives and white men in South America, according to which he will climb out on the branch of a tree but just overhanging the waters of some forest river, and lie crouched there, with his paw suspended in air, till a fish swims by near the surface, when he dexterously jerks it up and catches it in his mouth. In Darwin's *Journal of Researches* a picture is given of a jaguar thus employed, and when one sees it, one, of course, thinks that there will be a good description

of it, with, perhaps, an anecdote or two. But the same disappointment is in store for us as in the case of the jaguar and alligator in Mr. Bates' book, for the grand picture has hardly two lines of letterpress; which has vexed me so that I should call it unfair if I were quite sure Darwin had had nothing to do with it.

## CHAPTER XIX

JAGUARS AND PECCARIES—A FOREST DRAMA—STRENGTH IN NUMBERS—RETALIATION.

THE little peccary that we have been speaking about is the wild boar of America—especially of South America—and though it is tiny compared to the Indian wild boar, and sometimes gets into trouble, as we have seen, yet it is a fierce and dangerous animal, and, generally, knows how to take care of itself. Its principal enemy is the jaguar, the largest, and, perhaps, the most destructive, of the cat tribe, after the lion and tiger of the Old World; feared by every animal that scours the plains, or glides through, or sports amongst, the trees of the great forests, in which it is equally at home with the monkeys; feared, too, by man himself. Except the puma and the great grizzly bear of the north, all living things whose size makes them worthy its attention stand in dread of this ferocious and destructive beast. That is why I have made the peccary swear by the jaguars, instead of by the gods, as people used to once, in the days of old; for what would a pig be likely to know about the gods? No more than the ancient Greeks did. He might swear by the alligators, though, sometimes, but not so often, as, on the whole, wild pigs

in America suffer more through jaguars than alligators; so they would think them the strongest, and respect them accordingly.

I have said that the peccaries, though small animals—they are not more than about three feet long—are both fierce and dangerous. They are dangerous because they go in herds, and when any animal—such as a puma or a jaguar—threatens them, they form in a semicircle with all their heads turned outwards towards their foe, making an unbroken row of little sharp, curved tusks for him to leap upon, if he is so rash as to attack them. In that case he would, probably, never come from their midst again. They would surround him, squealing with rage, and though several of their number would, no doubt, fall victims to his teeth and claws, the rest—as many as could get near him—would soon have ripped him to pieces with their tusks. This need not be wondered at, since in India one wild boar alone is sometimes a match for the mighty tiger, and the two have been found lying dead together, the tiger almost disembowelled with the terrible slashing cuts delivered by the boar, and the latter with his back or neck broken. True, the Indian wild boar is himself a mighty beast, standing sometimes four feet high or more at the shoulder, and with tusks very much longer, even in proportion to his size, than are those of the peccary. Still, a herd of peccaries is worse than the largest single boar that ever stood, and all their tusks together are more effective still.

Occasionally, therefore, even the fierce jaguar itself, with all its sinewy strength and lithe agility—armed, too,

BESIEGED.

The peccaries drove the large jaguar in terror up into the tree trunk.

with the weapons of its tribe, the long canine teeth and hooked, retractile claws—falls a victim to the fury of these fierce little pigs, when banded together in herds. Quite recently, as I understand, a party of travellers found themselves present, as spectators, at one of these tragedies of the wilderness, of which wild nature is so full, but which are so seldom witnessed by man, even by savage man. In a clearing of the forest they came, suddenly, upon a huge jaguar, maintaining with difficulty a precarious foothold on the highest point of a fallen tree-trunk; to which it clung like a shipwrecked mariner on the mast of a sinking vessel, whilst, all around, there tossed and raged and bristled the living waves of a tempestuous sea of peccaries. Though just beyond the reach of his foes, the jaguar was not so much so, but that individuals of the herd, by leaping into the air, could sometimes strike their tusks against the tree, so near to his feet as to oblige, or, at any rate, to cause him to move them; nor did the fierce beast, though growling horribly, dare to strike at them in return, for fear of slipping on the smooth wood, from which the bark that would have offered him a securer footing, had long ago rotted.

As it was, the embarrassed, yet still savage, tyrant of the forest slipped more than once, and was only enabled by desperate agility to recover its vantage ground, in time to avoid the fierce leaps of a dozen or more of the peccaries. The latter sometimes leaped upon the trunk, and ran along it as far as to a certain branch, which, by dividing the narrow causeway, presented an obstacle which it was beyond their utmost efforts to surmount. When

they essayed to do so, they invariably fell amidst their comrades below, and as the attempt was renewed again and again, there was, for some time, a constant stream of ascending and then falling pigs, which presented a comic appearance, in strange contrast to the serious nature of the drama enacting. It would, generally, have been impossible for any one peccary to return, after reaching the branch in question, on account of those behind; but this none of them tried to do, but uniformly endeavoured to pass the branch by a leap round one or other side of it, in which they as uniformly failed. The branch itself, being not much more than a stump, ending in a sharp point at the place of breakage, was of no use to the jaguar, who, isolated on a narrow yard or so of horizontal fallen timber, cast many a longing glance at stately trees surrounding him on every side, and not far off, could he only have leaped clear of the circle of white, gnashing tusks. In this position matters remained for a considerable time, during the latter part of which the peccaries stood much more still, as though resolved to maintain a dogged siege, yet filling the air continually with their fierce squealing grunts, which mingled in a horrid manner with the no less savage growlings of the jaguar. The whole, we are assured, made a never-to-be-forgotten scene, and produced a corresponding effect upon the interested observers, who for some reason—perhaps because they were not naturalists—were content, on this occasion, to watch nature without interfering with her.

At length the end came. The jaguar, who had for some time been stretched out, clinging to the trunk, made

a slip with one hind foot, which for a moment, with the leg, hung down; and a peccary, leaping up at it, inflicted a slight gash. This seemed to determine the jaguar, for getting to its feet on the trunk, with a fierce roar, he took a rapid glance round the ring, and fronting the part where it seemed thinnest, crouched and then leaped suddenly out—a tremendous bound; but he did not succeed in clearing the circle. He fell amongst his enemies, several of whom, with fierce squeals, leaped up at him, and gashed him whilst yet in the air. For a moment it seemed as though he would struggle through; the next he was down, and the herd closed over him like the sea upon a yellow sandbank. From the mêlée came choked roars, and sometimes agonised as well as angry squealings, which, no less than the violent heaving motion above a certain central point, showed that a desperate struggle was still going on. But the jaguar was never seen again —only the wild tide of pigs, straining and struggling against each other, each eager to become a personal agent in the common act of death, the outer ones leaping on the backs of their companions in their anxiety to get within striking distance, whilst, ever and anon, one would appear struggling up from the confused tumbling mass at the centre of action, as though to avoid suffocation or urged by unbearable pain. These had to run down over the rest, and so join the outer circle, so closely were they packed; whilst one that appeared badly wounded was, for some time, tossed about on the unstable platform of its friends' bodies, whilst lying struggling on its side.

At length all was over, though it was long before the jaguar ceased to struggle, and still longer before the peccaries trotted off. On repairing, then, to the scene of the occurrence, the fortunate spectators of it found eleven dead or dying peccaries, lying in an irregular circle on the ground, and, scattered amidst them, the shredded skin and torn and mangled carcase of the jaguar, which as an anatomic whole might be said to have disappeared; with such vindictive ferocity had its small but savage enemies continued to assault it, long after life had become extinct. The account, if I remember, goes still farther than this, but, not having it at hand, I will not risk repeating inaccurately a statement which might seem to some, very remarkable. One should, however, remember that our domestic pigs are omnivorous, or nearly so, and it would not be particularly surprising if they inherited this quality from their savage ancestry.

This incident of the peccaries and jaguar affords a good illustration of the familiar adage that union is strength, for individually the boldest of these fierce little pigs would fall an easy prey to their redoubtable enemy, as may be gathered from the havoc he was able to make amongst them, even when surrounded and almost smothered by their numbers. It may be said, however, that under similar circumstances a tiger could, probably, account for several of the big wild boars of India, though he may occasionally be driven off, or even wounded to the death, by one alone. The pressed mass of bodies, unable through their own numbers to retreat or guard themselves, must offer fatal facilities to the teeth and claws of a crea-

ture capable of using them with effect, almost up to the moment of death itself. It is conceivable, therefore, that even a single full-grown male peccary might, for some time, hold a jaguar at bay, if he were not taken by him unawares. This, however, the jaguar almost always contrives to do; and indeed it is essential that he should, and also have a stronghold to retreat to, since it is but seldom that a peccary is found alone.

The jaguar's stronghold is a tree, and his *modus operandi*, when a herd of peccaries come trotting through the forest, as follows. Stealing cautiously through the underbrush, he marks the direction in which the herd are going, and then climbs a tree in their line of march. Crawling out upon one of the lower boughs, he waits till one passes underneath it, and then, leaping on its back, dislocates the neck by a rapid wrench round of it with his paw, and bounds into the tree again, leaving it dead on the ground. The ill-fated animal's companions rush up, excited and irritated, and vengefully surround the tree. The jaguar, however, within the ample domain of a large forest tree—for such he will have chosen—is entirely at home, and being, moreover, hardly discernible amidst the foliage and creepers, has seldom to stand a long siege. The restless little pigs, tired of inactivity and not having their anger whetted by the sight, and near proximity, of their enemy, soon go off, leaving their dead companion where it was slain; upon which the jaguar descends, and feasts upon it at his leisure. This is the account given by the inhabitants of Brazil and Central America of the way in which the jaguar procures a dinner of pork, nor,

since it is in itself probable and in accordance with the habits of the animal, is there any reason to doubt it.

It need not be supposed, however, that the peccary must always pass just under the chosen bough, so that the jaguar can leap directly down upon it. This, no doubt, would be the ideal state of things, but it is not always, or, indeed, often, that things come up to one's ideal. Failing this, no doubt, the jaguar would drop to the ground as near the peccary as he could manage, and develop a closer intimacy afterwards. A rapid bound or two, and with a growl or murderous roar, the "yellow peril" would be upon him, nor would his own pigtail avail him aught—caught unawares, all would soon be over. Still, even under these less favourable conditions, a wary member of the herd might, sometimes, save itself by making a dash to its nearest companions, or even, perhaps, in the case of a stout old boar, by resisting till these had run up. In wild nature there is continual competition between the attacking species and the one attacked by it, both attaining, by this means, to the perfection of aptitude in opposed directions.

## CHAPTER XX

THE GREAT CACHALOT OR SPERM-WHALE—HOW THE BULLS FIGHT —A BATTLE OF MONSTERS—GIANTS THAT EAT GIANTS—ENORMOUS CUTTLEFISH—THE KRAKEN A REALITY—DISAPPOINTED PROFESSORS.

A SLIGHT digression arising out of the subject took me away from the seals, or rather from the cetaceans, or whale tribe, which come next to them in that orderly sequence by which land animals pass, gradually, into water ones. Now, therefore, I will resume the thread. One of the very largest, and, in the sense of our title-page, most romantic of these great creatures is the sperm-whale or cachalot. He may grow to seventy-six feet long, with a girth round the hugest part of him of quite thirty-eight feet. Or say, rather, that he has been known to grow to that size. What he may sometimes grow to who can say? Just as there are, or have been, elephants standing twelve feet from the ground, though, as a rule, this largest of the pachyderms does not attain to much over ten feet, so *amongst* the giants of the deep, there are, no doubt, giants too, though, owing to their rarity, the chances are against the look-out man, in the crow's-nest of a whaling-ship, ever setting eyes on one. Why should not one imagine so, since with much greater facilities for observation, and much more variety, prob-

ably, in the subject of it, one might walk about the streets of London all one's life, without ever seeing a man seven feet high? Yet there *are* men seven feet high —yes, and eight feet or nine feet, or at least there have been—and so, perhaps, in the vast ocean solitudes that they inhabit, there may, here and there, be a great bull cachalot of eighty or ninety feet long—perhaps even a hundred feet.

But take him at his more ordinary figure—fifty to seventy feet or so—and what a gigantic monster he is! In appearance, from the point of the nose—where he seems to have been sawn through—to the middle of the back, he is like an enormous black tree-trunk. From here the body tapers, or rather slopes steeply, to the tail, where first a shape is observable—that, namely, with which we are familiar in the tail, or caudal fin, of almost every fish. Unlike the latter, however, the tail or "*flukes*" of the cachalot—as well as every other whale—lies flat-ways in the water, with its two points shooting out at right angles to the two sides, instead of to the back and belly of the creature. The difference is like that between the way a plank floats on the water, and the way in which the keel of a boat cuts through it. It seems curious that there should be such a difference here between the whale and the fish tribe, seeing that in each the tail has been gradually developed to meet the requirements of a similar mode of life. This being so, one might have supposed that the plan of the tail would have been the same in each, on the principle that one way —as represented by the whole class of fishes—must be

better than any other. Apparently, however, this is not the case, since cetaceans, on the whole, swim as well and as swiftly as fish. The tail in their case, and not the two hinder limbs, as with seals, has been modified into a fin, and it is curious that in the beaver, where it has also been modified to a considerable extent, in this direction the expansion has likewise been lateral and not vertical. We see the same thing in the case of many crustaceans, and throughout nature this principle of attaining the same end by a variety of means is apparent. This should teach us that it is a great mistake to think, as people often do think, that the particular way in which any animal does a certain thing is the only, or best way, in which it might conceivably be done. Even a man—if a clever one—might think of some improvement in the structure of most animals, in relation to their habits of life. Only he could not carry out these improvements. Nature alone can do that, and in her own time and way she is always ready to do so.

With this great tail of his—for it is in proportion to his own size, and sometimes eighteen feet from point to point—the cachalot, like other whales, can deliver the most tremendous blows, curving it at first, as does the crocodile, away from the object of its animosity, and then causing it to leap back with an impetus in which the natural force of the recoil is increased a hundredfold by the hearty goodwill which the creature, whose strength is enormous, puts into it. These dreadful blows are dealt with great sureness of aim, and, considering the size of the instrument inflicting them, with wonderful rapidity. Beneath their

flail-like vigour and fury the sea foams and spouts, the air is rent by a succession of thundering roars, like the sound of artillery, whilst about the mighty causer of all this vast commotion, the waters heave mountainous, the white waves break, the spray leaps, hisses, and flies till, huge and rock-like as the mass is that forms the centre of the area of disturbance, it is almost lost amidst the turmoil that its own energies have raised. Such scenes may be witnessed when two bull sperm-whales contend for the favours of one or more females, for, in opposition to the general rule prevailing amongst the cetaceans, these huge creatures are polygamous, each full-grown male collecting together a harem, with which he roams the deep, and which is of greater or lesser extent, in proportion either to his prowess as a fighter, or his personal attractions.

It is not with the tail only, however, that these battles are maintained. The cachalot belongs to the toothed order of whales, and his lower jaw, which is extraordinarily thin and slight, in comparison with the upper one and huge snout above it, is furnished with some fifty thick, curved, and bluntly pointed fangs, each one of which fits into a corresponding socket of the upper jaw, which latter, contrary to what one might expect, is toothless. These teeth, in old males, attain a weight of from two to four pounds apiece, and being composed entirely of ivory, form handsome as well as curious objects, upon which sailors are fond of exercising their skill in carving. They are to be seen, sometimes, upon the cottage mantelshelves of retired old salts, or on those belonging to the parents of younger ones, having been brought home to them from

one of their son's trips. Thus furnished, the jaws of the cachalot are a formidable weapon, even when used against each other, nor does the absence of teeth from the upper one seem much to diminish their effectiveness. For some reason, however, possibly because it is easier, or more effective, to bring the teeth down than to strike them up, the sperm-whale, before he makes a bite, is accustomed to turn on his back, as does a shark, and in this position he has often been known to crush a whaling-boat with, incidentally, a man or two that was in it, between his jaws. With what effect, therefore, they can be used against the softer substance of any denizen of the deep that may have the temerity to attack their owner, may be imagined.

Singly, unless it be the sea-serpent—for whose existence there is a large and ever-increasing body of evidence—there is no fish or aquatic mammal that has the least chance with him, but as a sword-fish and two killers were observed, on one occasion, to unite their efforts for his destruction, it is possible that the principle of combination may be sometimes more largely, and, perhaps, successfully employed. On the occasion in question it was certainly not successful. The sword-fish struck first, aiming for the heart, but, with a quick movement, the whale interposed his head, striking the weapon sideways, and then, rolling over and sinking himself beneath the aggressor, ere the latter had recovered from the shock of the impact, gaped upwards with distended jaws, which, closing like a scissors, on either side of the long, thin body, cut it completely in half. Meanwhile the two

killers had dashed in on either flank, but sweeping suddenly, amidst cataracts of foam, his enormous tail into the air, the mighty cachalot delivered with it a blow that stretched one of them dead on the sea, and then turning like a mountain in the water, pursued the other, now flying for its life. Here against three lesser giants—the sword-fish alone was some sixteen feet long—the issue of the combat was soon decided, but how many mighty strokes must be delivered, how often, yet unavailingly, must the vast jaws open and the huge teeth tear and rend, before one of two well-matched cachalots has defeated the other. Not infrequently, the under jaw of sperm whales that have been harpooned is found wrenched and twisted out of the straight line—sometimes to a remarkable degree. Such injuries can only have been received in fighting, and they are a proof of the fury with which such combats are waged.

Himself a monster, the cachalot feeds on other monsters of the deep, as huge, almost, and still more monstrous-looking than himself. It has long been known that some parts of the Pacific and Indian Oceans are inhabited by cuttlefish of a size sufficient to make them at least an annoyance, if not an absolute danger, to man. Captain Cook, in his first voyage, fell in with the floating body of one of these creatures, which, judging from the parts that were brought home and placed in the Hunterian Museum in London, must have attained a length of at least six feet, measuring along the body to the tips of the tentacles. Another, a larger one, was sighted by the French voyager Peron off the coast of Tasmania. The

is described as rolling over and over in the water, but whether alive or not, is not distinctly stated. It was, however, taken on board, and, on measurement, the arms, or tentacles, alone, were found to be seven feet in length. They were eight in number—the usual complement of the group to which this species belongs, and which is thence called *octopus*—and had the appearance of so many writhing and hideous-looking snakes.

Here, then, were ascertained facts, and if Nature could have been held back by the discreditings and head-shakings of learned professors, who piqued themselves on sobriety of judgment, these ample measurements would have remained the limit of her capacity, as far as cuttlefish were concerned. Here, indeed, in a parrot-beaked, sack-bodied cephalopod, with eight waving tentacles, seven feet long and as many inches in circumference at the base, we had a being—it might even be called a monster—quite capable of seizing, drowning, and even of afterwards devouring the most expert and stalwart of the Polynesian pearl-divers. What more was wanted? Why would people keep on talking about and even seeing cuttlefish of much greater size, by which discoveries professors themselves ran the risk of having, ultimately, to give their sanction to, or even to make, statements which, in spite of all their names and titles could do to make them look sober, would still smack a little of imaginative wildness? However, the thing continued—as, indeed, it had begun long before. Pliny—or was it Aristotle—had started it, by talking of tentacles thirty feet long, and thick in proportion; but Pliny, though a sort of professor himself,

had lived so long ago that he need not be treated like one. Later, in the Middle Ages, came rumours of cuttlefishes that flung their vast sucker-armed feelers aloft amidst the rigging of ships, and overwhelmed them in the waves. But this, too, was pre-scientific, and though the accounts of the great kraken of the Norwegian seas belonged to the age in which scientific voyages had been made, and cuttlefish actually measured, yet these were so obviously fabulous that no sober-minded scientist, with a reputation for incredulity to maintain, need trouble himself about them.

It was in 1750 that Pontoppidan, a Danish writer, and for the last seventeen years of his life Bishop of Bergen, in Norway, first gave to the world his account of the kraken and sea-serpent, and it must be admitted that what he says of both of them—but especially of the former—is sufficient to justify many a head-shake, on the part of grave people. The kraken, according to the bishop, has a back which, when it rises from the sea-bottom, provides anyone who may be in the neighbourhood, with a comfortable island of about a mile and a half in circumference. For an island, accordingly, it is often, and very naturally, mistaken. It may be landed upon and walked over with ease and comfort, but has the disadvantage of sinking slowly and leaving one in the water, if anything of a disagreeable nature, such as the lighting of a fire or the digging of a hole, is instituted upon it. Upon provocation, moreover, or when the creature is hungry, a forest of vast, snake-like trees, being its enormous tentacles, rise from and wave over the supposed

island, seizing and overwhelming any vessel that may be within their reach. As it sinks, too, a violent whirlpool is caused, owing to the displacement of the water consequent on the disappearance of so huge a body—in which whirlpool ships are sucked down. The waters, for miles about it, are discoloured with a turbid fluid—the well-known inky discharge of the cuttlefish—and shoals of fishes, that have been attracted by the monster's musky smell, and have lost their way in the darkness, are received into its vasty maw.

Such was the kraken, and with such an example before one it is no wonder that the learned world continued to fight stubbornly against the admission of tentacles more than seven or eight feet long, and eight inches round at the base. However, they still went on growing, and have become, at last, more authentic, so that there is now little doubt that the cuttlefish, on which the great cachalot habitually feeds, are sometimes of a size sufficient to bear comparison with his own enormous bulk. That they ever equal it—at least in weight—I should certainly hesitate to affirm, but that there are mighty cephalopods, whose eight or ten arms are capable of clasping the huge barrel of a sperm-whale's body, and must, therefore, be some thirty feet in length, appears to be settled by ocular demonstration. Mr. Bullen, to whose interesting work, *The Cruise of the Cachalot*, I am indebted for most of this chapter, was once looking over his ship's side at midnight, when there arose in the midst of that broad and shining pathway which the full moon of the tropics flings down upon the sea, a very large cachalot struggling with and, as it

soon appeared, devouring a squid, or cuttlefish, which Mr. Bullen distinctly says was almost as large as itself. The great arms of this eerie-looking creature were writhed about the whale's vast head, almost, if not quite, the hugest part of him, and certainly so, when, as was constantly here the case, the jaws were distended. As for the head of the cuttlefish, Mr. Bullen, after a very careful examination of it through the night-glasses—and it must be remembered that there was the whale's head beside it, to compare it with—came to the conclusion that it was, at least, as large as one of the ship's pipes, holding 350 gallons, but probably a good deal larger. The eyes alone he estimated as at least a foot in diameter. Huge as was this cuttlefish, it had not the smallest chance in its struggle with the cachalot. True struggle, indeed, as between the two, there was none, for the whale was simply eating the cuttle-fish, nor did he experience any difficulty in doing so.

Taking the softness of the cephalopoda into consideration, and comparing it with the hard, solid, block-like body of the whale, it is not easy to imagine that there would ever be a different result to a rencontre between the two. Still, this may be possible. By the mere doctrine of chances, it is very unlikely that the largest specimen of a creature but very seldom seen should represent the greatest size to which it ever attains. Eight great tentacles of, let us say, thirty feet long are, as we have seen, incapable of holding a large bull cachalot powerless in their embrace. But to what length may not those tentacles grow, and would a length of fifty, seventy,

or eighty feet be sufficient to do so? Sixteen mighty cables—for arms like these would wind at least twice about their enemy—would make a net from which even the hugest whale might find it difficult to free himself, and even he might at last yield to that paralysing effect which the suckers of the cuttlefish are supposed to have upon their prey. Then, again, there are female cachalots as well as males, and these are but half the size of the latter. Upon them or the young, are the wrongs of the giant octopus ever avenged?

I have speculated, in face of the incident here alluded to, upon the possibility of a cuttlefish's tentacles sometimes reaching thirty feet in length, but there seems to be better evidence—that of actual contact and measurement—of their sometimes being longer still. Whilst in the death agony the cachalot belches out the contents of his vast stomach, which consist, for the most part, of huge-sized fragments of such great cuttlefishes, which have been bitten off and swallowed whole. Mr. Bullen fished up and examined one of these fragments, which he found to be a piece of an arm about five feet square, having on it six or seven round sucking discs, of the size of saucers, armed on their outer circumference with large sharp hooks resembling a tiger's claw. On a subsequent occasion, still larger fragments were observed, their size being taken to equal that of the ship's hatch-house, which was eight feet long, with a breadth and height of six feet. What must have been the length of the entire tentacle, of which such blocks as these were the component parts? Since one of seven feet long measured only seven or eight

inches round the base, the calculation is not difficult to make, but I will leave the making of it to someone else. If we suppose, however, that these gobbets represented portions of the expanded ends, only, of two greatly elongated tentacles, which the various species of decapods possess, over and above the other eight, this would make their entire length immense: since such expanded part bears but a small proportion to the tentacle as a whole, and is not much more than twice its narrower circumference.

Look at it in what way we will, the creature that was bitten into such fragments as these, must have been of proportions so vast that the Bishop Pontoppidan himself can hardly have erred more in overstatement, than our grudging scientists have, in under-estimation. Seven feet for an arm or a tentacle! That was enough—we were to be satisfied with that. But no, neither we nor the cachalots are going to be satisfied with short commons. Though professors be virtuous there shall still be cakes and ale in the world. We shall have our monsters—our krakens and sea-serpents—let them bite their thumbs at them as they will. The Prince of Monte Carlo, too, not many years ago, found one for himself, and his naturalist called it *Lepidotenthis Grimaldii*. With a Latin name and a naturalist, there can surely be no more objection.

## CHAPTER XXI

WHALES AND THEIR ENEMIES—THE THRESHER AND THE SWORD-FISH — SPORT AMONGST ANIMALS — THE SWORD-FISH AND ITS WAYS—CANNIBALISM IN NATURE—THE SHARK AND THE PILOT-FISH.

THE sword-fish and killer, whose acquaintance we made in the last chapter, are two of the principal enemies of the larger whales; especially of those that are provided with baleen, or whalebone, instead of teeth, since they are more defenceless than the toothed whales, as represented by the redoubtable cachalot. Another of these enemies is the well-known thresher-fish, a species of shark which grows to a length of some fifteen feet, more than half of which is taken up by the tail, or rather by the upper lobe of the caudal fin, which is extraordinarily developed. In proportion to the bulk of the shark, it is thin and flexible, but the integument which forms its outer covering is so tough, and its edges so sharp, that wielded, as it is, with enormous power, it can cut almost like a razor. Armed with this formidable weapon, the thresher, as soon as it sees a whale rise, swims towards it, and leaping several yards into the air, delivers, with it, as it comes down, a terrible blow across the giant's back. So great is the force exerted that the silence of the ocean is suddenly broken by a report like that of a musket,

whilst the waters are instantly stained with the blood of the whale. The latter, roused to fury with the pain, endeavours to retaliate by striking with its own tail, in the manner of the cachalot, but, though a single blow of it would be fatal, the agility of the shark is such, and his size, in proportion to his gigantic adversary, so small, that he avoids this contingency, and continues to leap and to ply his instrument of flagellation almost unceasingly.

No single thresher, indeed, could do more than discommode a whale, but these attacks are usually delivered by two or more in company, whilst often threshers and sword-fish pursue their game, together, in packs. In this case, whilst a constant volley of blows falls on the whale's devoted back, the sword-fish dive beneath his belly and stab upwards with their much more formidable sword or lance. As against the thresher, the whale's best resource is to dive, but this brings no relief from the attacks of the other, and on his rising to breathe again, the flagellation is renewed. It is no wonder that, weakened with loss of blood, and covered with deep stabs, some of which, perhaps, may be mortal, the whale has at last to succumb. Possibly from amongst the pack of his enemies, he may have succeeded in killing some, but this hardly helps him —the wounds and stabs continue, and his blood flows more and more.

Such is the story which repeated observations, on the part of those best qualified for making them, have made familiar; nor is there anything which should cause us to doubt the truth of it, except the interesting nature and picturesque character of the facts narrated—a very broken

reed for the sceptical naturalist to lean on. He, of course, denies it, and is not at all impressed by such accounts of eye-witnesses as, for instance, the following. "One morning," says Captain Arn, "during a calm when near the Hebrides, all hands were called up at two a.m. to witness a battle between several of the fish called threshers or fox-sharks and some sword-fish, on one side, and an enormous whale on the other. It was in the middle of the summer; and the weather being clear and the fish close to the vessel, we had a fine opportunity of witnessing the contest. As soon as the whale's back appeared above the water, the threshers, springing several yards into the air, descended with great violence upon the object of their rancour, and inflicted upon him the most severe slaps with their long tails, the sounds of which resembled the reports of muskets fired at a distance. The sword-fish, in their turn, attacked the distressed whale, stabbing from below; and thus beset on all sides, and wounded, when the poor creature appeared the water around him was dyed with blood. In this manner they continued tormenting and wounding him for many hours, until we lost sight of him; and I have no doubt they, in the end, completed his destruction. The master of a fishing-boat has recently observed that the thresher-shark serves out the whales, the sea sometimes being all blood. One whale attacked by these fish once took refuge under his vessel, where it lay an hour and a half without moving a fin. He also remarked having seen the threshers jump out of the water as high as the masthead and down upon the whale, while the sword-

fish was wounding him from beneath, the two sorts of fish evidently acting in concert." As the fish are here stated to have been close to the vessel, it is difficult to see how a mistake could have arisen. Various professors, however, deny the truth, and even the possibility of these things; but the reckless negations of mere scientists should always be received with extreme caution, when opposed to the direct personal evidence of British seamen, as accustomed to scan as to sail the ocean, and in the constant, daily habit of keeping their weather-eye open.

As before remarked, the thresher is a species of shark, nor can he be said to be a very large one, since without the tail he would only be some six or seven feet long, and that part of him, efficient though it is, is so thin and supple that it adds but little to his bulk. Certainly one would not expect such a creature to make whales his habitual prey. nor is this the case, though common observation makes it certain that he does very often attack them. Usually, however, he feeds upon mackerels, herrings, and other fish that swim in shoals. These, if scattered, he drives together by threshing the water with his tail, going round and about them as does a sheep-dog with its flock, though with a purpose much less humane. Then, when the sea is thick with a wedged and struggling mass, he kills quantities at a time by a rain of flail-like blows.

The thresher—or fox-shark, as it is also called—and the sword-fish make, together, a strange pair of creatures, the one being extraordinarily elongated at the tail, and the other at the nose. It is curious to

find these two great fishes, developed thus in opposite directions, if not upon opposite principles, combining against a common object of attack, each helping the other with a weapon very different from its own. Of the two, that of the sword-fish is certainly the more deadly when used against a creature of any size, and since the thresher itself is doubtless good eating, one almost wonders that it does not occur to its powerful ally to kill it, rather than the whale. This it could probably do with impunity, for one thrust would be sufficient, and by striking from beneath, as it does with the whale, it would stand in no danger of the thresher's blows. Moreover, it is one of the swiftest swimmers of ocean, as might be gathered both from its powerful tail and the general lines of its body, which is elongated, even if we do not take the lance-like snout or upper jaw into consideration. The sword-fish, however, seems to possess a natural instinct for combination, since, on another occasion, we have seen it leagued with two killers or grampuses, in an unsuccessful attack on a sperm-whale. Possibly, therefore, it makes the pursuit of these huge creatures—more particularly of the whalebone whales, which are less dangerous—a speciality, being, no doubt, induced to it by the prospect of a rich and enduring banquet, and possibly also by the mere love of sport.

It is quite a mistake to imagine that animals do not enjoy killing, as we—that is to say, as some of us—do. On the contrary, every creature experiences a natural pleasure in doing that which it excels in doing, and when this excellence consists in any form of destruction, we

have the very type of the sportsman amongst ourselves. Thus many predaceous animals will always kill more than they can devour, if the opportunity for their doing so should occur. The stock instance given is the tiger, but under the requisite conditions it would probably be the same with all the Felidæ. They evidently find a pleasure in killing their prey, independent of that which follows when they feast upon its carcass. The same story is told by all those whose hen-house has suffered through the depredations of foxes; in fact, numberless instances are to be found of this love of killing, for its own sake, in animals formed to kill, but so scattered about in all sorts of books that it would take a long while to collect a good list of them. Now, the sword-fish is so swift and so deadly, and the sea is so full of creatures which it could, without any difficulty, despatch, that I cannot help thinking it is more the pleasure of repeatedly stabbing the huge whale, and seeing the blood rush out, which induces it to attack it, than the anticipations of a feast. It is just the same with the thresher, and I have, myself, very little doubt that these two go whale-hunting, just as people go elephant-shooting, and find the same sort of excitement in it. What is curious is that men who are accustomed to harpoon whales, and never have the smallest sympathy with them whilst doing so, become quite pitiful when they see them being killed in this way, and they never seem to think themselves at all like the sword-fish and threshers. The whale, no doubt, classes them all together, but it may think the harpooners the worst of the band.

# THE SWORD-FISH AND ITS WAYS

The sword, as it is called, of the sword-fish—though it is more like a long lance—is formed by the prolongation of the bones of the upper jaw. It is wedge-shaped, sharp at the end, and sometimes more than half the whole length of the rest of the creature's body—a most formidable weapon, which its owner can drive through the body of a porpoise or shark, or into the side of a whale, as easily as a lady can stick a knitting-needle into a ball of worsted. This may seem like an exaggeration, but it cannot be a very great one, since a sword-fish has been known to run its sword right through the timbers of a ship, though sheathed with copper, so as to pierce an oil-cask lying, with others, in the hold. Of course, under such circumstances, it was unable to withdraw the weapon, which was broken off, and remained so tightly wedged in the hole it had made, that neither did any water enter the ship, nor a drop of oil escape from the oil-cask. In the museum at South Kensington, portions of the hulls of ships, or of other hard substances, thus pierced, and with the broken sword lying either in or beside them, are exhibited. Probably, in these cases, the ship has been mistaken for a whale by the sword-fish, and such incidents may be looked upon as evidence both of his being able, as a rule, to distinguish the one from the other, and of his habit of attacking the whale in this way; for ships are so numerous that were it by chance merely that such things happened, they would probably happen more often.

I do not know if there is any record of men having been attacked by sword-fish, but in natural history books bathers are generally warned against them, and it is

difficult to imagine a more terrific creature coming to attack one in the water. A man may kill a shark even under these circumstances, and there are even negroes who are said to be expert in doing so. As the shark turns upon his back they dive underneath him, and then, as he turns over again, they stab him with a long knife in the belly, ripping him up. But then the shark is slow, and he has to pause and turn over before he strikes, which gives a man who is expert and keeps his presence of mind, a chance to strike at him first. The shark comes near the man—near him with its whole body, that is to say—but the sword-fish would not. His sword projects three feet in front of him, and so he would be three feet away, so to speak, when he first pricked the man with it. Only after he had been run right through would the man get to proper striking distance, and then it would be too late. Nor would there be any avoiding that sword-thrust—the sword-fish is so very swift, and comes with such a tremendous rush.

The sword-fish may attain a length of from twelve to sixteen feet, and is then a most formidable monster, to be feared by almost every inhabitant of the ocean, from the whale downwards. But a still more terrible, because a more cruel monster, is the saw-fish, a creature that grows to an even larger size, and carries, as his name implies, a saw, instead of a sword, in front of him. This terrific implement may be as much as two yards in length—just double the length of the other. It is flat and broad, narrowing slowly towards the point; and all the way down, upon each side, it is set with sharp quadrangular

teeth, each one being firmly fixed in a socket. The creature's real teeth are small and weak, so that it is difficult for him to eat hard, firm flesh. He prefers intestines, which are softer, and by means of his saw he is able to procure them. This he does by sinking beneath some unfortunate porpoise or dolphin—perhaps even a shark or a whale—and striking violent lateral blows at its belly; not spearing it with the keen, clean thrust of the sword-fish, but ripping it from side to side. In this way it tears out the entrails of its victim, and then greedily devours them as they float in the water. A more horrible thing can hardly be imagined. There is only this to be said, that the creatures thus cruelly used are as cruel themselves in pursuing and devouring their own prey—or, at least, they are as cruel as they can be. Whether that is a very consolatory reflection I really don't know, but I can think of no better one. In the sea, even more than upon land, every creature lives by killing and eating other creatures. There are no gentle scenes, or, at least, not many; it is all a carnage. The most peaceable and innocent creatures—the ones that we can think about with most pleasure—are the great toothless whales, for these, though so gigantic, have a gullet too small for a fish of any size to pass down it, and live, for the most part, on infusoria, which are creatures so minute, and so low in the scale of life, that they may almost be looked upon as belonging to the vegetable kingdom.

The whales, indeed, with their great jaws, in which, in a leisurely way, they enclose hosts of creatures so widely

distributed, yet at the same time so minute, that they make, as it were, a part of the water, in which they are often only distinguishable by the colour their numbers impart to it, may be said to browse the sea, as oxen and horses browse the fields. Yet these poor, peaceful giants are persecuted, as we have seen, by packs of ravenous creatures against whom their very size makes them almost defenceless. As for the toothed whales, some of them—as, for instance, the killer or grâmpus—are amongst the most voracious of the dwellers of the sea, so that, from the great cachalot down to the smallest fish, mollusc, or crustacean, it may be said that all marine nature is at fierce, carnivorous war. This war, too, is, for the most part, cannibalistic in its nature, and this cannibalism is of a peculiarly horrid description, since most fish devour numbers of their own offspring, for which, by the laws of nature, they feel no affection, and which they do not even know.

In these latter practices, indeed, the cetaceans, being mammals and very tender parents, do not participate; but there is another honourable exception, and that where we might least of all expect to find it. The sharks, so justly dreaded for their voracity, to which, as is well known, man himself not infrequently falls a victim, are solicitous of their young, with whom, to the number of a dozen or more, the mother swims about and does her best to provide them with food. The pretty little flock gambol and frolic about her, and should anything alarm them, they dart at once into her great mouth, held open to receive them, and disappear down her throat. There they remain

till their mother thinks the danger is over, when she opens her mouth again, and they re-emerge. This privilege —and it must sometimes be a valuable one—is also open to the pretty little pilot-fishes which, to the number sometimes of half a dozen, accompany the shark in all its wanderings, and which everybody has read about.

It is generally said in natural history books, that the relations existing between the shark and the pilot-fish are not quite understood: but since it must be an inestimable privilege to a little weakly fishlet that any large fish might snap up, to have a shark for a protector, and a shark-cavern to go into—not in the way that other creatures go into it—and since there is nothing which the shark eats that his friend may not have a share of, if he wants to, I really do not see what more one need understand, as far, at least, as the pilot-fish is concerned. Then, too, if—as there seems little doubt is the case—the pilot-fish acts as a scout for the shark, and brings him to anything eatable that he may find floating about in the sea, this fully explains the part which the shark plays in this little amicable arrangement. He protects his little guide and purveyor, not only by his presence but also by offering him an asylum, and the habit of seeking such an asylum has, no doubt, been acquired by the pilot-fish through his seeing the young sharks do so. He has lived in the nursery with them, and they have taught him the trick. Of course, as the pilot-fish shares in anything the shark gets, his wish to guide the latter to whatever he may be the first to find, as well as the trouble he takes to find it, is easily explained. It is not

an unselfish act, but one in his own interests, and thus all the requisites of an association of this sort, between two different species of animals, are fulfilled.*

When a shark is caught at sea, the poor little pilot-fish, as he is hauled up on deck, will leap up after him out of the water, in a vain endeavour to follow his life's companion. It is no use; he falls back again, the blue and golden bands with which his bright little body is decorated glittering in the sun—for there generally is a sun in the regions where these things take place. This certainly looks as though the pilot-fish were genuinely attached to the shark. It seems like the act of a faithful little friend, but it need imply no more than does his habitual following and keeping company with the shark in the sea. To be with the great fish has become an instinct with the little one, and so when the latter sees his convoy going somewhere where he has never gone before, he endeavours to go with him. Still, that a really friendly feeling may, through long association, have arisen between the two companions, though differing so from one another in size and appearance, does not seem impossible, or even unlikely. Of course, in considering a question of this sort, we should first get clear ideas of what friendship really is—the essential elements of which it consists. To do this is not, perhaps, so easy a matter as it may seem. At any rate, it is too difficult to be attempted in a work like this.

I make all these statements in regard to the relations

* Were the pilot-fish to eat alone, he would not be under the shark's protection.

existing between the shark and the pilot-fish, and between the mother shark and her young, upon the authority of Mr. Bullen, author of two interesting works, *The Cruise of the Cachalot* and *Idylls of the Sea.* In regard to the reception by the shark into her stomach—or, at least, down her throat—of both her young and the pilot-fish, this certainly does seem surprising, but as Mr. Bullen was, on various occasions, present when a shark was cut open and her family and retainers found inside her, the fact seems established. He writes, too—so I gather—as an eye-witness of the habit *au naturel.* I do not know, therefore, why there should be no reference to it in works that are supposed to instruct, except that, as a rule, the scientific naturalist has but two lines of conduct in regard to the more picturesque doings of any animal. First, he denies what is not in accordance with his ideas and non-experience, and then he refuses to say anything about such things—cuts them, as it were, even after they have been properly introduced to him, and their respectability vouched for. If he had a third line he might, in time, frankly describe them, but generally he has only those two.

## CHAPTER XXII

THE SHARK'S ATTACHÉ—QUEER WAYS OF FISHING—HINTS FOR NAVAL WARFARE—FISH THAT *DO* FLY.

THE little pilot-fish is not the only friend that the shark has. The remora, or sucking-fish, as we shall soon see, is still more attached to him. This is one of the queerest fish in the whole ocean. Others may have a more extraordinary, or, at any rate, a more terrifying appearance, but not one of them is constructed on such an original principle, or has such a very quaint and ingenious method of getting through the world. What the process is may be guessed from the name of sucking-fish, but the remora does not suck with its mouth, but with its head. The whole upper surface of this consists of "a large, flat, plate-like adhesive disc," and whatever this disc touches it adheres to with the greatest tenacity. The reason is that the air between the plate and anything it lies against is forced out, so that a vacuum is created, and when once this is the case, two things that touch each other always stick together. It is by virtue of this principle that a fly is able to walk along the ceiling, for all its six feet end in so many little adhesive discs or suckers, which act as strongly, in proportion to their size, as does that of

the remora. But the remora, when it uses its sucker, does not walk, or even swim, which is the equivalent of walking in a fish; all that is done for it by the shark or turtle, to which it attaches itself. It just swims underneath it, and presses itself against its under side, and there it is carried along as safely as if it were riding in its own carriage—indeed, much more so, for there is less likely to be an accident, and if ever there is, the remora can drop off without being hurt, as people generally are when they jump out of a carriage.

It is difficult to imagine a more secure and delightful way of going about, and of all sea-fish, the remora, as it seems to me, must have the easiest and safest time. To all but him the fierce and greedy monsters of the deep—the sword-fish and saw-fish, the threshers, the sharks, and the killers—are a terror and a menace. But what can any of them do against a little sucking thing that sticks tight against them, in a place they cannot possibly get at? The remora, if it liked, could fix itself to the very sword or saw itself of these two redoubtable warriors. It would not, probably, because when either were in action, it would have to come off; but just behind one or the other—on the hilt or the handle—it could manage quite comfortably. It would then be just in front of their owners' mouth, but yet quite unreachable, so that, supposing it to be a dainty, this would make a very good illustration of Tantalus. With the saw-fish, at any rate, such a situation would be quite possible, since there is a considerable space between the mouth and the beginning of the saw, and if there would not be room

enough for it there with the sword-fish, the under part of the lower lip, or jaw, would do just as well.

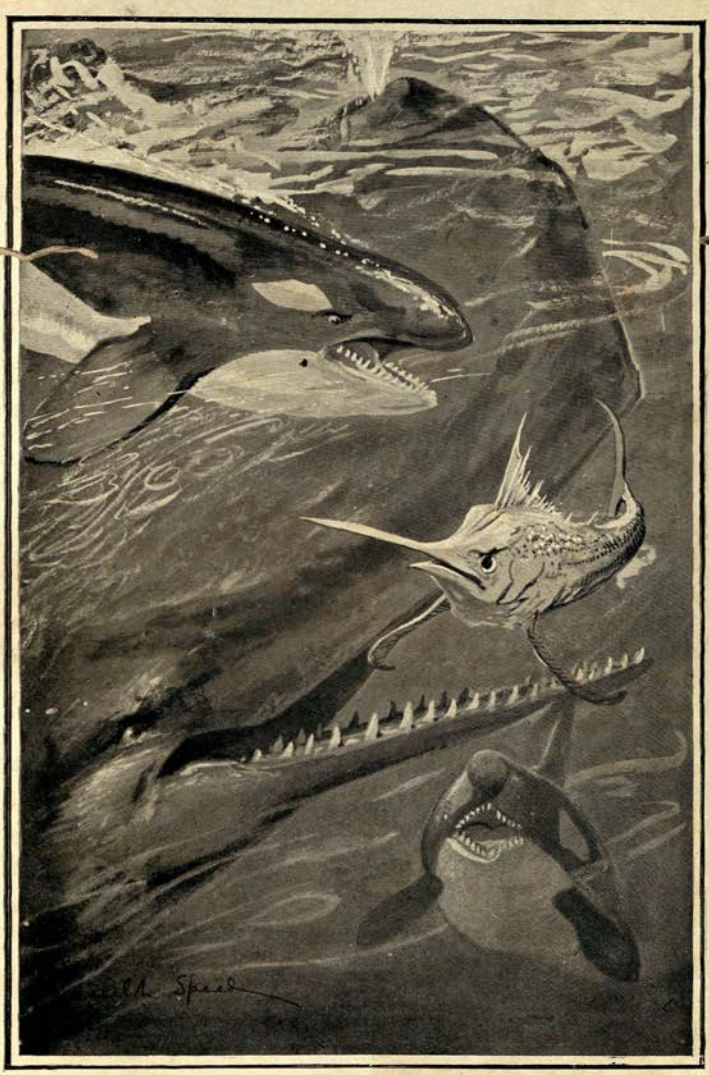
It is as the friend—or *attaché*—of the shark, however, that the remora is best known, and it is just in this position, or approaching to it, that he is said to fix himself—on the front or head part of the shark's body, rather than behind, or on the tail. Now, of course, when the shark is eating anything—when he is tearing at a dead whale, for instance—fragments of the feast will float about in the water, and the nearer the remora is to the mouth of the shark, the nearer these are likely to come to it. This is the reason generally given for his choosing the position on the shark which he is said to do, or for his swimming at the shark's mouth, when he chooses to swim with, rather than cling to him. However, as the remora is free to leave the shark whenever he chooses, and as the latter swallows his food whole, I cannot quite see what advantage he gains by being always in this advanced position. It is not as if he could not leave the shark, for then it might be a matter of life and death to him to be there. But as he must always know when the shark gets anything, and cannot well nibble the piece that goes down his patron's throat, as far as I can see he might as well sit lower down, as at the head of the table.

For myself, therefore, I doubt the reason given for his choosing the latter position, and I should doubt the fact of his doing so, if there were not some evidence for it. For the remora often attaches itself to the hull of a ship, and it is natural to suppose that, in such cases, it mistakes the ship for a large shark, or a whale. Now when it does

so, it either sticks to, or swims near, the fore part of the vessel, but not behind, or astern. Thus, Professor Moseley describes it as "swimming for weeks, near the water-surface, just a foot in front of the cut-water," and he remarks on this that "if it swam just behind the stern, it would get plenty of food, whereas in front of the bow it gets nothing whatever." "Nevertheless," continues the professor, "it stays on at what, in a shark, is, of course, the right place, ready to be at the beast's mouth directly food is found." This, therefore, seems to establish the fact. As to the reason of it, it has just occurred to me that when a shark bites a piece out of the living body of any creature, there must be a great rush of blood, and the remora would get the best benefit of this, if it was just by the shark's mouth, at the time. Or, again, the little fish may feel more secure there than elsewhere. A shark is a large thing—twenty, thirty, or forty feet long sometimes —and many voracious fish that might prefer to keep away from its head, might be bold enough, perhaps, to approach its tail or the after part of its body. The remora, apparently, is not in the habit of going inside the shark's mouth, as does the pilot-fish—so it may think the next safest thing to that is to keep as near it as it can, on the outside.

The wonderful power of adhesion, possessed by the remora, has been put to practical use by the Chinese, who actually employ it to catch turtles. A thin but very strong line is attached to a little iron ring, which is fitted round the base of the remora's tail, which, as it becomes very narrow just there, and then swells broadly out to

form the caudal fin, seems as if it were made for the purpose. Thus armed, the fishermen row or sail about till they see a turtle lying asleep on the water, and having come as close up to it as they dare, they drop several of these queer fishing-lines over the side of the boat—or sampan, as it is called. Should the remoras attach themselves to the sides or keel, they are dislodged with long bamboos, to which the lines serve as a guide, and then, swimming round about, before long they generally discover the turtle, to which they at once become fastened. If there were only one of them it might not be possible to draw in so large and heavy a creature as a turtle—at least, a large one—but with several it is not difficult to do so. The remoras are then detached, and can be used in this manner again and again, as well as to catch a fish or two, should it be so desired. Afterwards, when they have done their day's work, they can be eaten themselves, for that is the way of the world, not of the Chinese only, as some people seem to think. The Chinese, it may be remembered, fish also with cormorants, round whose throats they weld a ring, to prevent their swallowing the fish. Two more novel and ingenious methods of following the gentle craft were surely never devised, but the more ingenious of the two, perhaps—that which I have just described—seems to have been practised by the Indians of America, when the Spaniards, in an evil hour, first landed on that continent. Columbus himself—or if not he, one of his companions—has described the method, and how, when the remora is thrown overboard, it shoots "like an arrow out of a Bowe towards the other fish, and



THREE *VERSUS* ONE

A swordfish and two killers attacked the mighty cachalot in vain. He first bit the swordfish in two, then stretched one killer dead upon the sea with a blow from his tail, and the other fled for his life

then, gathering the bag on his head like a purse-net, holds it so fast that he lets not loose till hal'd up out of the water."* The Indians, however, seem to have used but one remora at a time, as apparently they do now, and if it fixes itself to a turtle, instead of hauling it in, they dive down, following the line, and swim with it to the boat.

We do not read that the old Greeks or Romans ever used the remora of the Mediterranean—for there are several species—to fish with in this way. If they had, they would probably have expected it to pull in anything—even a whale—for their idea was that this little fish, by affixing itself to a ship, could retard its progress through the water, or even stop it if it wished to. Thus it was believed that at the battle of Actium a remora held back Antony's ship, and thus contributed to his defeat. It seems strange that no one should have thought of turning such powers to practical account, not for fishing purposes merely, but also in naval warfare. Even now, were the story true, much might be done in this way. Instead of torpedoes discharged at the enemy's ships, we might read, then, of remoras having been successfully affixed to them.

There are several different kinds of sucking-fishes, and some of them—like the common lump-sucker which frequents our coasts—have the adhesive disc, or part, situated on the under surface. Of the true remoras there are also several species, the smallest being about eight inches long, whilst the largest attains to three feet or more.

If the remoras, by virtue of their parasitic relations

* From an old translation.

with powerful and dangerous species, are the most protected of all fishes, we may, perhaps, look upon the flying-fish of the southern seas as the most persecuted. At any rate, it is popularly supposed to be, and equally when it leaps out of the water, or, after a long, skimming flight, descends into it again, the bonito—a sort of large mackerel, its principal enemy—is understood to be hungering for it. For myself, upon general principles, I am inclined to doubt this. Animals, it is well known, enjoy doing what they do with ease and mastery. If they have an art, they like to practise it—they do not seek to hide their light under a bushel. Why, then, should not a fish that can fly, fly, sometimes, for its own amusement? That it should do so would be in accordance with all analogy; so, as it is no more than an assumption to hold that it does not, I shall hold that it does. One reads, often, about the gaping jaws of a dolphin, or albacore, appearing above the water, just as the flying-fish is about to descend into it—and no doubt this may frequently occur. But were the dolphin or albacore or bonito always expecting it—having pursued it underneath, in the water, as we are told—I believe the signs of this would be much more frequent. It would be the usual thing then, I believe, to see the jaws, or the whole body of the enemy, leap into the air, or at least for there to be some disturbance in the water, as the excursionist touched it. But this, as a rule, one does not see—at least, I have not myself.

Again, one reads so much about sea-birds hovering in the air, and ready to pounce upon the poor fish, as soon as they issue from the waves. However, though I have

made three sea voyages—one in a sailing-ship—I have never had the luck to see this; from which I gather that there is at least a good deal of respite from this evil, to which, moreover, other fishes are subject—for whether in air or water, what matters it? No doubt, however, but that the *Exocetus volitans*—to give it its Latin name—is ardently pursued, and eaten, as it deserves to be, with the greatest relish. That its fins have been developed into wings, for the express purpose of escaping from such pursuit, is equally probable; and therefore it would be very strange if they did not often enable it to do so. A good evidence of their efficacy is, I think, the enormous abundance of the species possessing them; so that perhaps, on the whole, these creatures of two elements, on whom so much pity has been bestowed, have a better, instead of a worse, time than the majority of their fellows.

The most curious thing I know about the flying-fish is that naturalists will keep on pretending that it can't fly. However, we must not be led astray by this, but go by the name and what our gallant seamen tell us. Also we should remember this, that a sailor, when he sees a fish flying, or anything curious, is a free man, whereas a naturalist, under similar circumstances, has his hands more or less tied by a sort of professional etiquette, which requires that he should not let an animal be more interesting than he can help, or give in to any picturesque fact, unless it can be stated in a dull kind of way. The facility with which, in able hands, this compromise may be effected, has led to many tardy admissions; but excep-

tional cases arise, and this, perhaps, may be one of them. For here is the tropic sea, blue as a sapphire, gleaming like a diamond, glancing and throbbing with such jewels of light that it looks as though thousands of silver fishes were jumping in the meshes of a golden net, flung down by the sun from the sky. All at once, from amidst these myriads of sparkles a number flash higher, leap into the air, and fly, like bright arrows, towards you. Onwards they come, and from being light only, they pass into form and substance, begin to live, to move with sense and volition, and, all at once, they are fishes, flying with wings over their home of the sea. They sink towards the water, rise again, sink, rise, then dip for one moment, and, the next, go glittering up into the air, and come spinning round in a curve. Thus they gleam on for a most astonishing distance, till, near you, they disappear into the sea, or, far away, become again the sparkling jewels of the sun. And all around, over the great, wide sea, these showers of living gems are leaping in and out of it. It is a most beautiful sight. The body of the fish is of a light, gleaming blue, and the delicate film-like wings, springing from just behind the gills, and extending backwards almost to the tail, set it, as they rapidly quiver, in a soft and silvery haze.

It is, of course, the pectoral fins that thus perform the office of wings, and by moving them and steering a course, their owner flies as truly, for the time, as does either a bird or a bat. Those who deny this—the naturalists aforesaid—say that the flying-fish never go for a greater distance, without touching the water, than the

initial impetus of their leap out of it carries them to. Now the swim-bladder of the flying-fish is so large that when the creature distends it, as it has the power to do, it occupies almost the whole cavity of the body, which thus becomes full of air, and, besides this, it has another sort of bladder in its mouth, which it can inflate through the gills. Thus it is all air, and everybody knows how difficult it is to throw a light, bladdery thing to any distance—a stone goes much farther. What sort of impetus must that be, which can, in this instance, throw it to 500 or 1,000 yards, and is it not more likely that a small fish (it is only about a foot long), whose fins have become developed so as to support it in the air, and whose body has been turned into an air-sac, should have been enabled to fly, rather than leap, these wonderful distances? When I first saw flying-fish myself, I felt quite angry at the nonsense I had been made to believe about them, through the natural history books, and from that moment I resolved that I would be as cautious in trusting to what are called sober statements, as to statements that may seem to be exaggerated. Certainly it is the sailors, here, and not the scientists, who best know what they are talking about, and so, as they have seen a great deal more of flying-fish than I have, instead of repeating my own opinion, I will end the subject, and this chapter, with that of one who, to all the advantages of a sailor, adds those of being a careful observer and a very picturesque writer. At any rate, I don't see how he can have been mistaken in such matters as these, and, if not,

there ought to be an end, at last, of that long-enduring fallacy that the flying-fish cannot fly.

Mr. Bullen then—and I quote him as an authority—says at page 133 of his *Idylls of the Sea:* "As the result of personal observation extending over a good many years, I assert that the Exocetus *does fly.* I have often seen a flying-fish rise two hundred yards off, describe a semicircle, and, meeting the ship, rise twenty feet in the air perpendicularly, at the same time darting off at right angles to its previous course. Then, after another long flight, when just about to enter the water, the gaping jaws of a dolphin gave it pause and it rose again, returning, almost directly, upon its former course. This procedure is so common that it is a marvel it has not been more widely noticed. A flying-fish of mature size can fly a thousand yards. It does not flap its fins as a bird, but they vibrate like the wings of an insect, with a distinct hum. The only thing which terminates its flight involuntarily is the drying of its fin-membranes and their consequent stiffening."

## CHAPTER XXIII

THE SEA-SERPENT—MANY OCCASIONS ON WHICH IT HAS BEEN SEEN—CONSCIENTIOUS SCEPTICISM OF SCIENTIFIC MEN—A FIGHT BETWEEN MONSTERS—THE LARGEST LAND-SERPENT—SNAKES AND SNAKE-STONES—MEDICAL EVIDENCE—A COLONIAL REMEDY.

IT used to be thought that the great whales—the cachalot, the rorqual, and the Greenland whale—were the largest of ocean's dwellers, but if evidence is of any value whatever, there is one marine creature that is larger even than they—indeed, so much larger and more powerful that he is able to make them his prey, conquering them—even the mighty sperm-whale himself—by main strength put forth in single combat. This portentous monster is, of course, the great sea-serpent, which has been seen, at intervals, probably from time immemorial, and recorded also from, at least, as far back as 1734. In 1740 we have Bishop Pontoppidan's word for its appearance—and we know now that he was right about the kraken—who describes it as having a length of 600 feet; and in 1822 it was again seen off Norway, and again it was 600 feet long; so, perhaps, it was the same one.

Then, in 1829, there is a description of such a creature, seen in the Indian seas, which tallies, on the whole, with the later joint account of Captain McQuhæ and Lieu-

tenant Drummond, of H.M.S. *Dœdalus*, in 1848. Captain McQuhæ describes the creature that he saw, as an "enormous serpent, with head and shoulders kept about four feet constantly above the surface of the sea," and "as nearly," he says, "as we could approximate, by comparing it with the length of what our maintopsail yard would show in the water, there was, at the very least, sixty feet of the animal *à fleur d'eau*, no portion of which was, to our perception, used in propelling it through the water, either by vertical or horizonal undulations. There seemed to be as much as thirty or forty feet of tail, as well." This great serpent, which, however, by this computation, would not have been so large as the largest whales, "passed the ship rapidly, but so close under our lee-quarter, that had it been a man of my acquaintance I should easily have recognised his features with the naked eye. It had no fins, but there was something like the mane of a horse, or, rather, a bunch of seaweed, washing about its back." It swam at about the rate of fifteen miles an hour, and was in sight for a full twenty minutes. Lieutenant Drummond thought the creature looked more like an eel than a snake. It had, he thought, "a back fin ten feet long, and also a tail fin." The head, too, he describes, I think, as of a somewhat different shape, and says that it was "rather raised and occasionally dipping." Still, there is nothing in the one account that is irreconcilable with the other, nor is it often the case that two people, seeing the same thing, describe it in just the same way. The *Dœdalus*, at the time that this creature was seen, was somewhere between the Cape of Good Hope and St. Helena.

Twenty-seven years later, in 1875, the officers and crew of the barque *Pauline*, whilst sailing in the Indian seas, had a still more interesting experience. They were, one day, watching three large sperm-whales not far from the ship, when a most enormous serpent, shooting suddenly out of the water by the side of the largest one, encircled it in two coils of its body, and in about fifteen minutes, during which time there was a terrific struggle between the two leviathans, succeeded in crushing it to death. This, at least, may be assumed, for one by one the ribs of the unfortunate whale were heard to crack, with a sound resembling the report of a small cannon, and, at the end of the time stated, the snake dived downwards, carrying its victim with it, head first. When one thinks of the enormous strength of a large bull cachalot, which may be from fifty to eighty feet in length, one can form some idea of that of the monster by whom it was overpowered, yet possibly it was not so much the strength of the great serpent as the application of it, by which the whale was vanquished. Could it have got any portion of the sinuous body within its vast toothed jaws, or could it have delivered a blow upon it with its mighty tail, the issue of the combat might have been different; but enveloped in a double noose, each foot of which was charged with enormous constricting power, its strength was choked out of it; and as the serpent's tail—or that part of it beyond the folds on one side—no doubt hung down in the water, whilst as much of the neck as was disengaged on the other would have been equally out of harm's way, what could the whale, who was all the time

suffocating, do? Neither with jaws nor tail would any effective reply have been open to him. He might almost as easily have struck or bitten himself, as the preposterous enemy that was wreathed so closely about him.

When one comes to think of it, it is most extraordinary what powers are contained in the limbless body of a snake. The ancestors of snakes had limbs, as can be proved by dissection, for in some, even now, the minute bones of rudimentary hind legs lie embedded in the flesh. They are, of course, perfectly useless, and their presence can only be explained on evolutionary doctrines. Snakes, then, have lost their limbs, and the theory is that they have lost them because they gradually came to require them less and less, not because their body got to be better adapted for the uses to which limbs are put. And yet to a very large extent this has actually come to be the case. For instance, one thing that the two forelegs, or arms, seem specially fitted for, is to clasp or hug, as we see not only with ourselves, but, to an even greater extent, with the ant-eater of South America, or—according to popular belief, at any rate—with the bears. A snake, however, with its long rope-like body, can hug with infinitely greater power and effect than can the strongest pair of arms belonging to an animal of the same size—or, rather, weight. But not only arms, but even hands, may be eclipsed, for the whipster of America, by coiling two different parts of its body round the body of another snake, and then suddenly straightening out the portion between them, which has hitherto been looped, can tear

the individual so attacked into halves. It is doubtful, however, whether a monkey of comparable size could do the same with hands and arms together. In both monkeys and men, again, one of the most useful offices of the hand—perhaps we may call it the chief office—is to convey food to the mouth, but this a snake can do with a coil of its own body, if not as well as ourselves, at least a good deal better than can many animals, whose hands are only paws.

Again, most animals can raise themselves on their hind legs so as to survey the surrounding country, and they walk with their heads raised more or less in the air. These privileges snakes are supposed to have forfeited, yet some of them can stand several feet high, if they wish it, and they can even get over the ground—and that at considerable speed—with the head and front part of the body held thus high in the air. When a creature loses certain highly developed organs, which it once possessed, it is said to have degenerated—to have become a more lowly organised being—and the theory is that as its wants were lowly, it has gained by the change, for a complicated structure is only an encumbrance when it is not required. What good, for instance, would arms and legs be to a man, if he only cared for crawling through mud? He had much better lose them, and become like a worm. But if snakes have lost their limbs in accordance with these principles, on what principle is it that they can do as much or more without them, as other animals can with? For my part, I can't help thinking that their wants,

instead of diminishing, increased, and that, as their limbs didn't improve, they used their bodies, and found they did better with them.

The different people who had seen the sea-serpent on board the *Pauline* went before a magistrate, and made a statement to that effect, which was taken down in writing. I have read it, and it agrees with all I have said, except that there is nothing in it about the cracking of the whale's ribs. As, however, this is mentioned as having occurred, both in Chambers's *Encyclopædia* and elsewhere, I suppose it really did—that is to say, that the men who witnessed the combat, heard the loud noise like a cannon-shot as each rib broke, and talked about it afterwards, though they did not mention it before the magistrate. The sea-serpent, as well as other huge monsters of a less snake-like appearance, continued to be seen at tolerably frequent intervals after this, and the last time, I think, was only a year or two ago. Again it was a serpent, and off the coast of Norway, and it came so near, that the ship, which was not a large one, seemed endangered, and someone who was on it fired a shot, on which the monster sank.

From all this evidence it would appear that there are various unknown creatures of vast size inhabiting the sea, which are but rarely seen, and that one of these is a gigantic serpent that crushes its prey to death, like a boa-constrictor on land. When one thinks how vast the expanse of ocean is, how profound are its depths, and how inaccessible, compared to the land, is the floor over

which its waves roll, this does not seem very wonderful, especially as, even on the land, new animals, sometimes of considerable size, are from time to time discovered. The real wonder is that the sea-serpent should have been disbelieved in for such a very long time. Now, a great many people do believe in it, even including some of the more learned ones, who tell us so in solemn, pompous strains, as if what they thought about a thing was almost as important as the thing itself—or, indeed, quite, if not more so. There are scientists, in fact, who seem really to fancy that by giving their adherence to anything, they allow it to be, and so, as it were, create it; nothing else, surely, can explain the sense of awful responsibility under which they seem to labour. No wonder, then, that they should hesitate before saying, "Let there be sea-serpents!" Any conscientious man would, taking their size and voracity into consideration.

Next to the great sea-serpent, the largest and most powerful constricting snake that we know of is the anaconda of South America, which grows to at least thirty feet long, and is said by the Spaniards to be capable of overpowering and eating a bull. Hence the Spanish name for it is *matatoro*, or bull-killer, but whether the name is founded upon a fact or a fiction does not appear to be certain. Waterton thought that the Spaniards must have known what they were talking about, and that the very name was an evidence of the thing. He was told, moreover, that the matatoro grew to a much greater length than thirty feet—more than double as long, in fact—but of this, again, there is no

satisfactory evidence. It does not seem in itself impossible that a snake of even thirty, or thirty-five, feet in length should be able to destroy a bull; but there is one thing which inclines me to doubt the anaconda's doing so, as well as its growing to such a size as the Spaniards reported. Before South America was colonised by the Spaniards there were no cattle in the country, so we must assume that this great snake was not larger or stronger than would be necessary to allow it to overcome the largest wild animals with which it came in contact. These would be the jaguar and the tapir, and as neither of these are so large, or, I think, so strong as a Spanish South American bull, the latter ought, one would think, to be too much for an anaconda. This is not quite conclusive, indeed, for the jaguar itself found no difficulty in preying on horses and cattle as soon as they were introduced, though it had had nothing larger to attack, before, than the tapir or huanaca. Nay, more, the puma, which is smaller and more slightly built than the jaguar, at once began to attack these large animals, as though it had been both "native and to the manner born." Still, in the manner in which these creatures secure their prey, agility and skill—since they generally dislocate the neck —may come more into play than sheer strength, whereas it is the latter that would be most required by a serpent, in the actual process of constriction, after the seizure had once been made.

Be this as it may, the safest plan is to limit our ideas in regard to the destructive powers of the anaconda, by what it has been known to do, and I do not think that

there is any properly authenticated instance of its having killed a bull—not for us, that is to say; there may be cases known to the Spaniards. Now, the anaconda is very fond of the water—indeed, it is almost, if not quite, as amphibious as the crocodile; and I have sometimes wondered if it does not prey upon the latter. If it does, then we probably see in this the starting-point from which the great oceanic anaconda, or sea-serpent, has been developed. We have only to picture the remote ancestors of the latter having got first to the mouths of the rivers, and then further and further out to sea, proceeding from crocodiles to sharks of about the same size, and so to larger sharks, and thence, gradually, to more and more gigantic marine forms, till at length, in fierce contention with rorqual or cachalot, the zenith of power was attained.

Other snakes which live in the sea are small, or comparatively small, and these, which, unlike the sea-serpent, are very well known, are extremely poisonous. They, no doubt, have had their origin in some water-loving viper, or other kind of poisonous snakes, of which there are many examples—most snakes, indeed, are fairly at home in the water, and all, probably, are perfectly well able to swim. Of venomous land-snakes the most deadly, perhaps, is the well-known cobra, or hooded snake, of India. The skin of the neck, in this species, is flattened out from just behind the head. Under ordinary circumstances it lies loose, and is not so very noticeable, but when angry or excited the cobra can inflate it, and it then becomes very conspicuous. To do so, it rears its head, together with the upper part of its body, into the air—standing, as it were, on its tail,

and, hissing loudly, presents a both strange and terrifying appearance.

This is the snake that the Indian snake-charmers lure out of its hole by playing on a sort of pipe, and then catch and handle with impunity. I, at least, believe that they can do so, and also that they are able, should they chance to be bitten, to cure the bite by applying to it a curious substance, which is called a snake-stone. I believe it because one of these snake-stones has found its way into Africa—probably through the Portuguese—and there I have seen it in the possession of a Dutch family of the name of De Lange, who, though poor people, once refused fifty pounds for it. This proves their belief in its efficacy, and that belief has been founded upon a number of trials, every one of which was successful. Here is one of them—I quote it from my brother's work, *Travel and Adventure in South-East Africa*, pp. 14–15: "De Lange told us that the value of the stone was well known in the district, as it had saved the lives of so many people—whom he named—and several horses. Amongst other names he mentioned that of a daughter of an old elephant-hunter, named Antony Fortman, who, he averred, had been bitten by a cobra some years before, when quite a child. As the stone had to be sent for, it had only reached her, he said, just in time to save her life. Two years later, in 1877, this story, at any rate, met with a curious confirmation. At that time Antony Fortman was at Tati, in Matabili-land, with his family, his eldest daughter being a girl about sixteen years of age. I had quite forgotten about the snake-stone, when one day, the conversation turning

on snakes, Antony Fortman said to his daughter, 'Turn up your sleeve, and show Mr. Selous where the snake bit you.' This she did, and on the girl's left arm, near the shoulder, was a very large and ugly scar, as if a piece of flesh had sloughed away, and the wound had then skinned over. Fortman then proceeded to tell me how the girl had been bitten, some years before, in Marico, when quite a child, and that a horse had been saddled up at once, and a messenger despatched for De Lange's snake-stone, how the little girl had become insensible and turned nearly black before the stone arrived, and that it had been twice applied before it drew out the snake-poison. Both De Lange and Fortman described the action of the stone in the same way. Friedrich de Lange told me that he had brought this snake-stone with him from the Cape Colony, and that it had been an heirloom in his family for some generations." Evidence like this appears to me stronger even than the sneers of doctors, though that, too, should be strong, considering how constantly they have sneered at the truth in whatever new form it presented itself—inoculation, mesmerism, and so forth—anything, in fact, that they did not understand, so that they were never at a loss for material.

Almost, if not quite as poisonous as the Indian cobra, is the rattlesnake of America, and, again, the puff-adder of Africa. However, I am not writing a book about snakes, so as space obliges me to finish this chapter, I will only add that I once walked right over a puff-adder without stepping on it, and consequently without its biting me. If it had done so it would have saved me a great deal of

worry and trouble—as is usual in such cases—for I was alone on the top of a very steep hill, and the homestead lay a long way off at the bottom. The brandy-bottle, therefore—which is the colonial remedy for being bitten, as well as for not being bitten, by a puff-adder—would not have been forthcoming, and I had no snake-stone in my pocket.

## CHAPTER XXIV

HUNTING RUSES AMONGST THE HIGHER ANIMALS—WOLVES, FOXES, AND JACKALS—UNTEMPERED JUSTICE—GESTURE-LANGUAGE IN MEN AND DOGS—THE CAPE HUNTING-DOG AND HIS PREY.

IN several of the preceding chapters we have seen something of the stratagems and contrivances made use of by various creatures—fish, insects, birds, or crustaceans—in order to secure their prey. Similar devices, as might be expected, are not unknown amongst the mammalia also. The list, however, is not so long as one might expect, considering the superior intelligence of this class of animals, but we must remember that it is not so easy to study the habits of wild quadrupeds as it is those of insects and various small creatures. It is principally with wolves, foxes, and jackals that the observations in question have been made, no doubt because such animals, owing to their abundance, or through other reasons, have come more into contact with mankind.

All these three species, either habitually or occasionally, hunt together in concert—that is to say, either two or more carry out a certain plan, in which each helps the other. Thus, in India, Mr. Elliott observed, one morning, two wolves standing side by side as though in consultation,

whilst far off, upon the plain, grazed a small herd of nylgaus—the typical Indian antelope—on which their eyes were, from time to time, fixed with a greedy longing. At length the plan of campaign was decided upon. One of the wolves trotted quietly off to a small nullah or ravine, where it lay down amidst the bushes with which its sides were dotted, whilst the other, with a stealthier pace, made a wide circle which brought him, at length, unobserved, on the farther side of the antelopes, and at no great distance from them. Further concealment was now unnecessary, and suddenly flinging off the mask, the wolf rushed down upon the startled creatures, and began to drive them towards the nullah. This it did by continually rushing round, either on one side or the other, according as the herd showed a disposition to break away to right or left of the line along which they were required to go, exactly as a sheep-dog drives the sheep to the fold. At length, when the nullah was reached, the wolf that lay behind a bush on the very edge of it, leapt suddenly out, and selecting a doe, sprang upon it, and being joined by its fellow strategist, the two soon pulled it down, and feasted on it at their leisure.

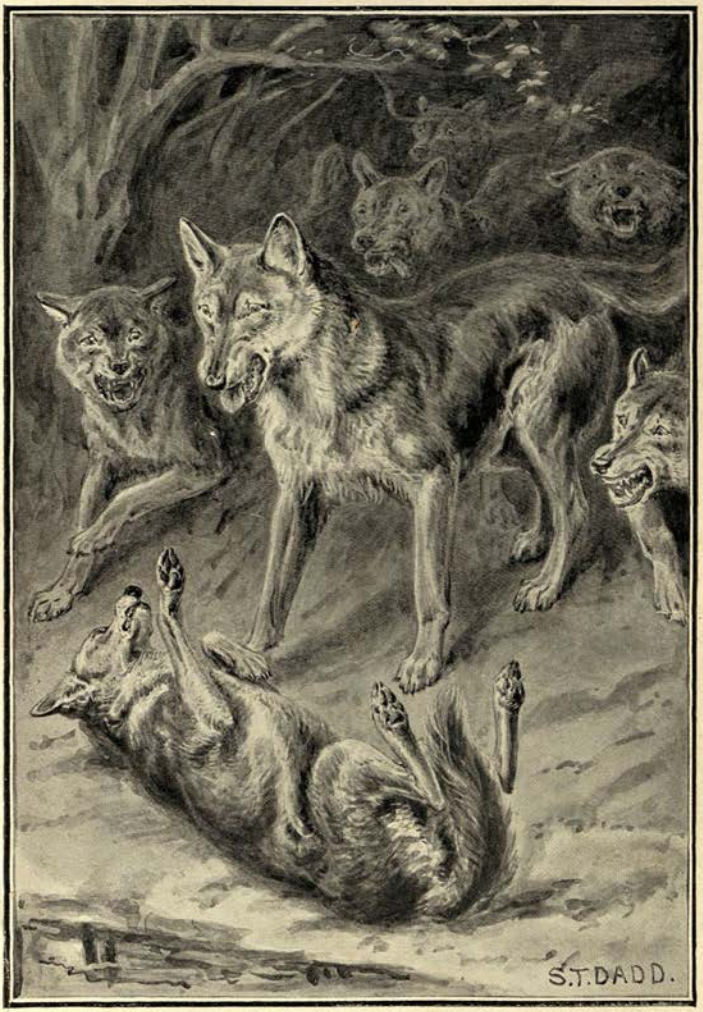
What would have happened had the wolf behind the bush failed in securing an antelope, and had the herd in consequence got away? We may surmise from the following anecdote, as told by Jesse in his well-known *Gleanings from Natural History*. "A sportsman — I think it was in Scotland—had walked out one evening with his attendant, hoping to shoot a hare. They proceeded together to some rocky ground, part of which

formed the side of a very high hill, which was not accessible for a sportsman, and from which both hares and foxes took their way in the evening to the plain below. There were two channels or gullies made by the rains, leading from these rocks to the lower ground. Near one of these channels the two men stationed themselves. They had not been there long when they observed a fox coming down the gully, and followed by another. After playing together for a little time, one of the foxes concealed himself under a large stone or rock which was at the bottom of the channel, and the other returned to the rocks. He soon, however, came back chasing a hare before him. As the hare was passing the stone where the first fox had concealed himself, he tried to seize her by a sudden spring, but missed his aim. The chasing fox then came up, and finding that his expected prey had escaped, through the want of skill in his associate, he fell upon him, and they both fought with so much animosity that the parties who had been watching their proceedings came up and destroyed them both," thus making incomplete a most interesting observation.

In all probability, therefore, the two wolves, had the one that lay in ambush missed his spring, would have fought too, and this makes me the more inclined to believe a story which was told me—not, however, by an eye-witness—of wolves in America: from which it would appear that when the stratagem is carried out by more than a pair of associates, the duty of seizing the prey, if it devolves upon a single member of the band, may be a very dangerous one indeed. In the case alluded to, the

wolf that had to do this lay down by a small stream, at a place where it was fordable, and a wapiti was driven down upon it, through woods that fringed the bank, by the rest of the pack, amounting to a dozen or more. Knowing the ford, the wapiti made straight for it, and the wolf, springing up at the critical moment, either missed his mark or was shaken off by the powerful quarry. He was foiled, at any rate, and the wapiti, dashing into the water, gained the opposite bank and got clean away. Hardly had he disappeared when the pack, headed by a wolf of great size and strength—evidently the leader—came up, and now a most remarkable and, withal, tragic scene was enacted. The wolf that had failed flung itself on its back, and whining in the most pitiful way, appeared to bespeak the mercy of its incensed fellows, and especially of the grim-looking leader, whose action in the matter all seemed to await expectantly. For a moment or two—during which the whines and cries of the wretched criminal rose to an agony—the latter seemed to waver, but ferocity, or long-established custom, carried the day. He sprang forward to execute justice, and his example being instantly followed by the rest of the pack, the poor penitent was quickly torn to pieces and devoured on the spot. I cannot, as I say, vouch for this story, as I have not read or heard the original account of the person who is supposed to have witnessed the incident, but it tallies very curiously with the other two, both of which are authentic.

Everybody is familiar with the way in which a dog, when it wishes to propitiate its master and to deprecate




AWAITING JUDGMENT.

The great leader of the wolf pack stood over the wretched delinquent, hesitating whether to be merciful or to give the signal for him to be torn in pieces.

punishment when scolded, throws itself on its back with its tail turned up between its legs. Now this is a habit which every dog has brought with it from its wild ancestry, and one may be often seen to employ it towards another when it is afraid to fight, knowing that it would be well beaten. It is the converse, as it were, of the bristled back and elevated tail, with which dogs approach each other when they really mean to fight, and with neither of these two *expressions*, as one may call them, can man have had anything to do. We now see to what use the first of them is put by wild, canine species, and if it was not on this occasion effective, we may be sure that on many others it both has been and will be.

There is another very curious and interesting thing in connection with this habit amongst domesticated dogs. If man has not taught it to them, they possibly may have taught it to him. Somewhere in the *Odyssey* of Homer—I cannot give the place, but I have often read references to it—it is told how when travellers come to a village, and a lot of fierce dogs belonging to the inhabitants rush out upon them, they immediately squat down on the ground, and that then the dogs cease to molest them. Now Dr. Schliemann, when he travelled in the Ionian Islands, found that this was the regular habit with the peasants on coming to strange villages, or when they visited shepherds living, with their sheep, in the open country. The same expedient is resorted to by the peasantry of Hungary and Macedonia and other countries of Europe, where the conditions of life are more or less primitive; also, I believe, in the East, or

parts of it, and—most interesting of all, as showing the habit to be almost universal—the Kaffirs of South Africa, under similar circumstances, act in the same way. The chief Lo Bengula, before he learnt, too late, the real ends and aims of the Aryan, had some large, fierce dogs, which used to rush out to attack any native that came to see him, at his primitive palace. To offer any resistance to their onset would have been death to anyone, and the resource employed, just as in the other cases, was to crouch on the ground, in which lowly and defenceless position—though sometimes one of the men would get a bite—they were generally let alone.

The dog, therefore, seems to understand this attitude in a man, just as he does the still more prostrate one employed by himself, for, in truth, it is very similar. A man who meditates attack, or intends to defend himself, stands firm and erect, with chest expanded and head thrown back. When he sinks to the ground, with his head hung, his arms resting passively, and his chest drawn in—as follows naturally from the position—all this is reversed, and the one posture as strongly expresses submission, or, at least, a peaceable intent, as the other does war and defiance. I do not imagine, however, that man has really studied the dog's method and made use of it himself in order to disarm him, but rather that his own mode of expression is governed by the same principle, and that having been accustomed to deprecate the wrath of a superior by crouching before him, he puts the same plan in practice to mitigate canine fury.

The jackals of Ceylon—as no doubt of India and other

countries—employ the same kind of stratagem for the securing of prey, as do wolves and foxes. A pack of them will surround any covert having a limited area, into which they have seen a hare or one of the smaller kinds of deer enter, and some always take care to station themselves about the path where the game entered, and by which they know it will most likely come out again. Possibly their places may be assigned to the various members of the pack by the leader, for it is he, we are told, who gives the signal for the attack to commence, by first raising his voice in the loud and peculiar cry which all who live in lands where jackals roam know so well. "Okkay! okkay! okkay!" he repeats in howl upon howl; "Okkay! okkay! okkay!" come the answering cries of the rest, and into the jungle they all dash, and out of it, shortly afterwards, at the expected place, dashes, if all goes well, the terrified animal, to be pulled down on the outskirts.

This is a good ruse, but a still more cunning one is sometimes employed by the jackals of India—that is to say, they have been seen to employ it, for no doubt other jackals might act in the same way, under similar circumstances. In this instance a considerable number ranged themselves at intervals along a patch of jungle skirting the shores of a lake, and just within it, so as to be concealed. Here they quietly waited till, about midnight, by the light of the moon, a fine axis deer was seen to leave the jungle and advance over the narrow strip of foreshore which separated it from the water. Just before

commencing to drink it turned and snuffed towards the jungle, but either the wind must have been in the right direction or its thirst overcame its caution, for turning again and stooping to the cool stream that lay white and still in the moonlight, it took a draught so deep and so long that it seemed as though it would never be ended. At last, however, it was satisfied, and walking back, swollen now and distended through the inordinate amount that it had swallowed, it was about to re-enter the jungle, when a jackal, springing with a yelp from its outer fringe, barred its further advance. The startled deer wheeled suddenly round, ran for some distance along the open space, and then again tried to enter the jungle, only to be again driven back by the same sharp yelp and spring, striking terror to its heart. A fresh attempt was frustrated in the same way, and being followed by a longer run, the deer now passed out of sight, but for a long time yelp succeeded yelp at irregular intervals, growing fainter and fainter till they were lost in the distance. The result of the ruse was not, therefore, in this instance witnessed, but in all probability it justified the sagacity of the jackals. Forced to keep running whilst its stomach was swollen with the water it had drunk, the deer must soon have become exhausted, and as little able to fight as to escape through speed—in which condition the pack would have closed upon it and pulled it down.

But why were the jackals so anxious that the deer should not enter the jungle? Any obstacles which the thickness of the undergrowth might have offered to their

own pursuit would, one would think, have been still more effective in checking the flight of their victim, in which case they ought to have been able to tire it out, and then pull it down all the sooner. Possibly, however, the axis, being an animal many times larger and stronger than themselves, might be able to plunge through covert which they would be unable to penetrate, or, again, it might have turned to bay under more favourable circumstances.

The witness of this very interesting scene was no other than the "last man" of the ill-fated Afghan expedition of 1841–2, who appears to have been an intelligent observer and trustworthy recorder of the ways and habits of animals. He was unable, as he thought, to estimate the number of jackals engaged in the hunt, on account of the possibility of each one having turned back the deer many times, by running past it and posting itself again. This does not appear to me likely, for if the jackals were able so easily to outrun the deer, they might have pulled it down then and there, if in large numbers, and if there were only a few of them, it does not seem likely that they could ever have overpowered so strong an animal. I think it much more probable that there was a jackal to each yelp, and that, seeing where the deer was about to turn in, it was able to shift its position in time to meet it, if not exactly posted, before. Indeed, all these ruses seem based upon the superior speed of the animal against which they are employed, for if two or more wolves or jackals can run down a deer or an antelope, why should they not do so together, instead of one hiding and the other driving the prey? For this reason, though it is stated that the

one wolf drove the herd of nylgaus to the place where it wished them to go, as a shepherd-dog drives a flock of sheep, I must suppose either that it could not have overtaken them, or that there is some flaw in the reasoning of the animal when it lays the trap. No doubt a short chase is better than a long one, but the idea which one receives when one reads of a wolf running on this or *that* side of an animal, so as to drive it just where it wants it to go, is that it could overtake it if it pleased. With the foxes, however, everything is plain and straightforward, since, except by stratagem, they could not possibly catch a hare.

All animals, however, like to take their prey by surprise, if they can, and of this I have myself seen an interesting instance in South Africa, where I lived for nearly three years. I was once riding along the waggon-road—a sandy trail winding amidst thick thorn-bush—somewhere in Bechuanaland, when all at once there jumped out, upon either side, a pair of Cape hunting-dogs in act to spring. They were bending, indeed, and all elastic, on the very point of making the leap, when, taking in the situation both at the same time, they each stood a little up on their hind legs, and with a curious look of having made an awkward mistake, they turned and disappeared into the bush again, the whole in silence—they did not utter one sound. No doubt the dogs had heard the beat of the horse's hoofs along the road, and thinking it was wild game, had hidden, one on each side, prepared to leap together, as it passed, and pull it down. From the total change of their whole demeanour, and their expression—

very like a dog's when it has made some foolish mistake —I feel quite sure that they had not expected a man to be mixed up in the affair, nor is any instance of their attacking one, even when in numbers, on record, so far as I know. It seems evident, therefore, that they could not have seen me before, as I came riding along, since one glimpse would have shown them that a man was on the horse.

But now a puzzle arises. It is not usual for game to come trotting along the waggon-road, nor does the Cape hunting-dog ever attack the oxen or horses of white men in the interior—at least I have not heard of its doing so. Why, then, did these two take up their position on either side of the path as though to wait till something passed along it, a thing which would only happen at very long intervals, and then would be more likely to be a mounted man, or a waggon, or oxen, than anything else? Unless some antelopes are accustomed to use the waggon-roads in South Africa, which I have never heard of their doing, judgment here, on the part of the two dogs, must have been at fault. For this reason, though nothing seemed clearer than that this had been their plan at the time, I do not now think that it was. I believe they were governed entirely by their sense of hearing, which was either so acute as to bring them both to just the right place, and at just the right time for the joint attack, or else that they judged, by the regularity of the hoof-beats and the direction in which they were proceeding, that the animal, whatever it was, was coming along the road. The last, I think, is the most likely, and

this, again, would show that one of the wild indigenous animals of South Africa has, by this time, learnt the use and meaning of the waggon-roads that cross the country.

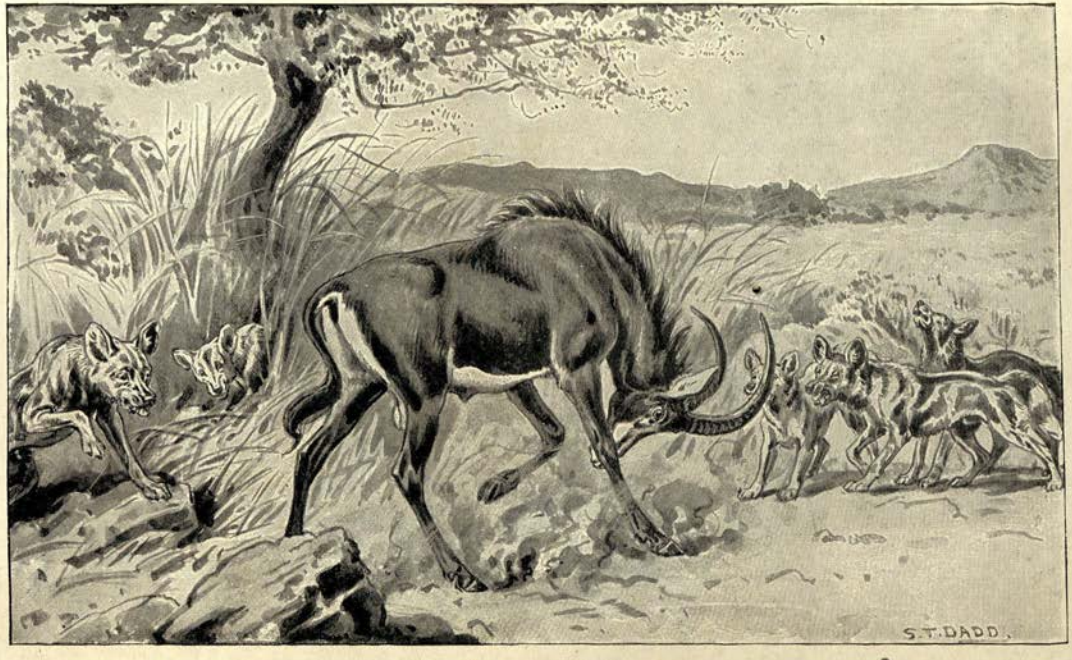
All the above stratagems are of a collective nature—two or more animals, that is to say, take part in them—and these are more interesting than where merely one is concerned, since the capacity to combine of itself shows a high degree of intelligence. A simpler sort of ruse or wile may be displayed in the manner in which a beast of prey assaults and overpowers its victim, and this is especially the case where it hunts alone, and the quarry is much more powerful than itself. These two wild dogs were prepared, evidently, to attack a large animal jointly, but either of them, probably, would have been able to run down and kill one of equal size, in the open. A sable antelope is a larger animal, I should say, than the Basuto pony I was riding—it stands higher, at any rate, and has a very formidable pair of horns, which it can use most adroitly, and with deadly effect. The Cape hunting-dog knows this well, and when it overtakes its dangerous quarry, which it can do with ease, instead of holding on to it, in which case it would be immediately transfixed, it springs up and inflicts just one bite in the flank, letting go instantly and then pursuing it again. In its next spring it gives another bite in just the same place, and in this way it, at last, succeeds in tearing open the poor beast's flank, from which the entrails then protrude and can be cruelly torn out and devoured. Of course, under these circumstances, the poor antelope soon

dies, and is eaten by the dog—a process, however, which, in all probability, is commenced by the latter some time before life is extinct. Such is Nature, and as there is no appeal from her ways, it is no use quarrelling with them. The best plan is to be an optimist, and then everything seems right in a trice.

As far as I know, there is only one published account of a sable antelope being pursued by a single Cape hunting-dog, in this way, nor was the incident, in this case, witnessed to its natural conclusion. It has not been absolutely proved, therefore, that such a chase may be brought by the dog to a successful conclusion; but I myself have no doubt whatever that it both can be and sometimes is, for I do not believe that wild animals ever attempt what it is not within their power to achieve, though, of course, they may sometimes fail in the attempt. They are guided by their experience, and though there are exceptions to every rule, it is safe to assume that, in the important concerns of their life, we never see a grown wild animal either making a first experiment or doing a foolish thing.

The account above alluded to is by my brother, and as it is very interesting, I will conclude this chapter with it. "We this day witnessed a very pretty sight, as we were riding across a wide, open down, between the Zweswe and Umfule rivers. We had a short time previously noticed a solitary old sable antelope bull feeding on the edge of a small strip of bush that intersected the plain. Suddenly this antelope, which was six or seven hundred yards distant, came running into the flat straight

towards us, on perceiving which we reined in our horses and looked around for the cause of its alarm. This was soon apparent, for before long we saw that an animal was running on its tracks and, though still distant, overhauling it fast, for the sable antelope, not being pressed, was not yet doing its best, so that when it was about two hundred yards from us, its pursuer, which we now saw was a wild dog, was not more than fifty yards behind it. The noble-looking antelope must just then have seen us, for it halted, looked towards us, and then turning its head, glanced at its insignificant pursuer. That glance, however, at the open-mouthed dog, thirsting for its life-blood, must have called up unpleasant reminiscences, for instead of showing fight, as I should have expected it to have done, it threw out its limbs convulsively and came dashing past us at its utmost speed. It was, however, to no purpose, for the wild dog, lying flat to the ground, as a greyhound, its bushy tail stretched straight behind it, covered two yards to its one, and came up with it in no time. It just gave it one bite in the flank, and letting go its hold instantly, fell a few yards behind; at the bite the sable antelope swerved towards us, and upon receiving a second in exactly the same place, turned still more, so that, taking the point on which we stood for a centre, both pursuer and pursued had described about a half-circle around us, always within two hundred yards, since the sable antelope had first halted. As the wild dog was just going up the third time, it got our wind, and instead of again inflicting a bite, stopped dead and looked towards us, whilst about a hundred yards from it




THE END OF THE CHASE.

Sable antelope attacked by Cape hunting dogs.

the sable antelope also came to a stand. The baffled hound then turned round and made off one way, whilst the sable antelope, delivered from its tormentor, cantered off in another."*

* *A Hunter's Wanderings in Africa.*

## CHAPTER XXV

MAN AND BEAST IN THE FAR NORTH—TRAPS THAT ARE SEEN THROUGH—A NEW DISCOVERY—CUNNING OF ARCTIC FOXES—THE TRAPPER AND THE WOLVERINE.

THE various ruses mentioned in the preceding chapter were all of an offensive character, employed, that is to say, by one animal in order to entrap and prey upon another. But as much cunning may be shown by a creature in avoiding death as in inflicting it, or in securing its food. The two kinds, indeed, are often combined, as was seen in the last case mentioned, where, but for its ingenious method of attack, the dog must soon have been impaled on the horns of the sable antelope, an animal in comparison with whose size and strength its own are quite insignificant.

The same remark applies to those crowning instances of animal strategy in which the endeavour—constantly successful—is to avoid the artifices of man himself, since the successful springing of the trap is followed by a triumphant meal upon the bait with which it is set. There is nothing, in its way, more interesting than that keen, hard, close competition between the brain of man and beast that is going on day by day and year by year in the fur-bearing regions of the North, especially over

the snowy wastes of the Hudson Bay territories in the far north of North America. The cunning shown by the arctic foxes, especially in avoiding the various kinds of snares laid by the trappers for their destruction, is truly wonderful, and we should be justified in disbelieving many of the facts narrated were they not well authenticated and, indeed, notorious in those parts.

It is, for instance, quite a common "dodge" for a trapper to set his spring-jaw traps upside-down, and the reason for his doing so is that the foxes, having discovered the principle of the mechanism, are accustomed to scratch away the earth from under the trap, and then, putting their paw up—through the jaws, indeed, but from the outside, so that it cannot be enclosed between them, as they fly up—to press upon the pan and start the trap. When the trap is set upside-down, therefore, the fox is taken by surprise, and for a short time the trapper may have success. But very quickly the new experience is gained, and the traps are now started from above instead of from below. Another change may be resorted to, but this is not likely to be successful unless some time has gone by, and, of course, the natural result of continued variation in the way of setting the traps, is to make the foxes more and more observant of the way in which they lie. They become, therefore, more and more difficult to catch, and the trapper's best plan is to keep moving from one part of the country to another, in the hope of getting a few skins in each. The reason why the foxes learn so quickly by experience is that they are not solitary-living animals, but go about either in pairs or small companies.

When, therefore, one is caught, its mate or its fellows are witness of its misfortune, and have the dreadful incident stamped upon their memory, not only by reason of the fear which it inspires on their own account, but also through the sorrow and sympathy which the sight of a suffering and often, perhaps, a tenderly loved companion arouses in them.

Another way of trapping, or of trying to trap, the foxes is by setting a loaded gun, with a string tied, at one end, to the trigger, and, at the other, to a piece of meat. The meat lies some thirty yards from the muzzle of the gun, with which, of course, it is in a straight line, and the string, for the whole distance, is buried under the snow, the gun being also concealed, either in the same or some other way. All that appears is the piece of meat, which lies, by itself, on the snow, as if it had nothing to do with anything. When the fox seizes it, however, he pulls the string, which in its turn pulls the trigger, and the gun, going off, shoots him dead*—a very humane sort of trap indeed. But it is just the same as with the other kinds. After a very few foxes, or, sometimes, after only a single one has been shot, no more are to be got in this way. The first poor victim lies upon the blood-stained snow, but over him bends his affectionate consort, whining and wretched, yet not so given up to grief but that the intellectual faculties are rather sharpened than

* The gun is set with great exactitude and on a nice calculation, so that the fox, if shot at all, is shot in the head. He dies, therefore, suddenly, and without pain, whilst not expecting it—which some think the best kind of death.

obscured by the bitterness of the loss. The fatal cord attached to the meat, which, in despite of tears, she has perhaps managed to swallow down, lies now exposed. She follows it up, sniffing it and sometimes touching it with her paw, and soon arrives at the evil-looking object, which she knows has, for the time, exhausted its death-dealing power. A careful examination imprints it on her memory, and through life, now, in particular, she carries a picture in her mind of that string attached to the trigger. It was the pull that did it. With that there came a sudden flame, and the roar of death was in her ears. Three feet, at least, she leaped into the air—higher, possibly, if perchance a pellet or two struck her—and then raced away over the snow that was her husband's winding-sheet. She returned to find him dead, and there, from his very jaws, from the protruded tongue that would never be passed over her in kindness and affection again, lay that thin dark line upon the snow, that connected him visibly with death. Never, in all her earthly pilgrimage, hereafter, will she forget that lumps of meat, though seeming to lie loose upon the ground, may yet make part of a trap, full twenty-five or thirty yards away, and that to touch them, whilst they do make part of it, means swift and certain death. But they may be disconnected. That thin and subtle ligament from which the whole danger proceeds is easy to sever; but how to sever it without setting in motion the thing to which it is attached—that little, insignificant-looking thing, which, as it is the part that the string touches, must be the key to set in motion the whole infernal machine? Smaller even than the pan

of the well-known toothed trap, which, by being pressed on, causes the jaws to fly up, it must act on the same diabolical principle. Something is set loose by it—something that flies out to where the meat is, and kills the fox that is eating it. Something—but what? No matter; whatever it is, it is death. It comes and it kills, and it can only come from that long, ominous-looking tube, which is hollow at one end, and only one. Just from that end it was—quite a long way in front of the trigger—that the flame of fire flashed out. To be in front of that, then, and to pull the string, is death; but once behind it, the string may be pulled with impunity. Still, there is the trigger. To be behind that must be safer still, and if the string can be gnawed so as not to pull the trigger at all, that will be the safest of all. As for the string, there is no danger in *it*. It is to start the trap merely. It is not the trap itself. *That* is obvious. Even a cub might see that. The whole thing lies in the trigger. If you pull that, you let off the trap: but if you can gnaw through the string without pulling it, you can take the meat without the trap going off, or if you can let the trap off without its hurting you, you can take the meat afterwards.

It may be thought that not even foxes, though they are known to be cunning, could reason in this way; but if facts are to be taken as evidence, they must reason still more strongly. Not only do they draw the conclusion that to be behind the muzzle of the gun is to be in safety, but they even adopt a plan by which they are able, with almost equal safety, to go up to the meat and let the gun

off, by taking it in their mouth. In the latter case, of course, the string need not be cut at all—except, indeed, afterwards, to eat the meat—but when it has to be, it is always that part of it which is near the trigger, that the fox gnaws through. This shows plainly that the danger must be connected in the animal's mind not only with the string and trigger, but with the muzzle of the gun; but though it must, therefore, know that, being where it is, the gun might be fired with impunity, the fox, having decided to sever the string before seizing the bait, does not do this, but leaves the trigger still on the cock. Now, as it must be as easy to gnaw through the string without discharging the gun, at one part as at another, it must be as a precaution against a possible accident that the fox does so at a point where, if it did go off, it could not hurt him: since it assures itself doubly, it cannot be said that it has not room for more than one idea in its head, at the same time.*

But now comes the second plan—not quite so perfect as the other, as the fox may get a pellet or two in its skin, but, perhaps, involving even a greater degree of intelligence. Instead of going to the gun, the fox, in this case, digs a trench in the snow up to the meat, which it then seizes and pulls into the trench, where it lies flat. The gun goes off, but the fox is not hurt, for—and this is the

* The string must run, for a little way, behind the trigger (before passing round a stick) in order to start the gun: and it is this part of it that the fox gnaws. If we assume it to do so, as believing the trigger to be the part of the gun from which the discharge comes, still there are the two ideas—to gnaw the string, namely, thus preventing the discharge, and to get behind the trigger whilst gnawing it.

most wonderful part of it—it has drawn the trench at right angles to the muzzle of the gun—to the line of fire, that is to say—so that the shot, instead of raking the channel, as it would do if it were in a straight line with the gun and string, only strikes the edge of the cutting, and goes flying over it. If men were besieging a hostile town, and wished to approach it under cover of a trench, so as to avoid, as much as possible, the bullets from the walls, this is just how they would manage it. They would not, any more than the foxes, draw it all in one line with the line of fire, for then the bullets would fly down, instead of over it, and every man in it would be killed. The brain of the fox, therefore, as far as this particular thing is concerned, is equal to that of man, and as the trench is always drawn in the same way, we may be sure that mere chance has nothing to do with it. The reason why the fox is able to draw the meat into the trench before the gun goes off, is that the cord which connects the bait with the trigger is always a little longer than the distance between the two, for if it were not, as it is liable to shrink during changes of the atmosphere, when the weather changes from dry to moist, the gun would sometimes go off of itself. As a rule, therefore, the meat can be moved five or six inches, without anything happening, and this just allows the fox to pull it down into the ditch, where he lies with it, out of harm's way. So here are two quite different ways—each as cunning as can well be imagined—by which the fox gets the better of the trapper, and though the human element enters into such episodes as these, they still make part of the romance of

animal life, seeing that the life of an animal whose skin is in demand is one long pitched battle with man.

But cunning as are these arctic foxes, there is one animal which seems to outdo even them in its instinct, as one may almost call it, for avoiding all danger, and especially snares, traps, or pitfalls of any and every description. This is the celebrated glutton or wolverine, an animal which, as it is not only never to be taken itself, but enjoys nothing so much as destroying all traps that it finds set for other animals, is the very despair of the trapper. It belongs to the weasel family, but in form and general appearance is more like a bear than one of these animals, being stout in the body, with long large limbs and shaggy fur, whilst it walks on the soles of its feet, which is an ursine mode of progression. Its tail, however, is a conspicuous feature, being thick and bushy, though short. In size it surpasses every other member of the family to which it belongs, so that it is able to make so large and strong an animal as the beaver its prey. It is even said that it will occasionally attack and overpower some of the larger species of deer, dropping upon them from out of the branches of trees, and then tearing at their throats. Whether this is true, however, I do not know, nor, for our present purposes, does it much matter, for it is only from the standpoint of its cunning, or, perhaps one should rather say, of its intellectual competition with man, that I am going to discuss the wolverine here.

It is not that the trapper has any wish to catch him—not for his fur, at least, which is worth little or nothing. The wolverine is not wanted, and would be let alone if he

would let other people alone, but this he will not do. Nothing pleases him better than to come across a trapper engaged in his occupation, for then he knows that for some time to come he can have meat without the trouble of killing it. Where he lives—in the great pine forests of North America—the marten lives, too, and the fur of the marten is very valuable indeed. The trapper goes through the woods setting a long line of traps, and when once the wolverine has come upon this line, he follows it day by day, and never leaves off doing so till he has destroyed every trap, eaten the bait, and sometimes the marten that he finds inside it. These traps are not the steel ones that are set for the foxes, nor are they the spring guns either. The marten's skin is so valuable and, at the same time, so small, that the trapper does not want it to be injured anywhere. The skin of a fox that has been shot in the head or caught by one of the legs, is almost as valuable as if it had not been damaged at all, but it is not the same with the marten. His skin is wanted intact—without a flaw upon any part of it. The trapper, therefore, makes a curious trap of branches —or "poles," as he calls them—which are set in the ground, so as to make a sort of little chamber or wigwam, which has only one way into it, and across that way a noose, or something, is arranged—I am not quite sure what; they never tell one in the books—so as to *kill* the marten, but without injuring his skin, as he gets inside.

The wolverine comes to one of these little wigwams, and knows exactly what it means. There is something inside to be got, and a door to walk in by. That some-

thing he means to have, but he is not going in by the door. He knows what would happen if he did. That is one of man's horrible treacheries—pretending to be kind and nice to animals, but meaning to destroy them all the while. It is a trap, and the way to get the better of a trap is never to do what it asks you to do, or, at least, not in the way that it asks you to do it. So, being asked to go in by the door, the wolverine pulls out some of the poles at the other end, and goes in that way, taking the bait from behind. Having done this, he generally proceeds to show his contempt of the whole thing, and especially, perhaps, of the man who thought he could take him in, by destroying the trap *in toto*, scattering the poles all about, and then going off to do the same with the next. In this way the whole line of traps are treated one after another, and if a marten has been caught in any of them, the wolverine eats as much as he wants and hides the rest—for he is very fond of taking things away and hiding them. One may imagine the rage of the trapper when he comes back to look at his traps. Either he must get rid of the wolverine in some way, or leave that part of the country altogether. To lie in wait with a gun, himself, would be a tedious business, and the chances are that the wolverine would either smell him or find out his whereabouts in some other way, and so take care not to come near. He determines to trap him, or at least to try to. Half a dozen traps of different sorts—acting upon different principles of destruction—he makes himself, with all the skill and ingenuity that his own cunning, sharpened by a lifelong experience, can suggest,

and he sets several steel ones as well. Every three or four days he comes to look at them, but always, if the wolverine has been there at all, he finds one of two things. Either the baits have been taken and the traps pulled to pieces, or else both trap and bait have been left severely alone. In this latter case the cunning animal has feared to touch them. There are his tracks all about, and in some places the marks of his body, where he has lain down and gazed intently at the things he was trying to understand. But he was not quite satisfied, had not entirely grasped the principle, not penetrated as deeply into the matter as, under the circumstances, he would like to do. Therefore he would not touch it. Until he saw clearly just what the idea was, the trapper must really excuse him: he would much rather leave it alone. As soon as he had discovered it, he might be relied upon—the bait was most attractive—but until then he preferred to go on with the marten-traps. They were quite simple: no difficulty at all about them. For, of course, all the while, the trapper, who cannot afford to lose time, and hopes every day to catch the wolverine, keeps setting his marten-traps as before.

At last he gives up what he has been trying, and determines to set a spring-gun—not in such a way as he might hope that an ordinary animal would get shot by it, but more cunningly than he has ever done it before. So not only does he lay the gun amidst bushes, so that it is quite concealed by them, but blockades the way to it, as it were, with a small pine-tree, so that it is neither to be seen nor got at. The bait—a nice juicy piece of meat—

A Mischievous Beast.

A wolverine, finding a backwoodsman's house empty, will clear it of everything movable down to the gridiron.

lies temptingly just on the top of a bank that rises from a little lake where the wolverine goes sometimes—when the trapper is not there—to drink. As he turns to walk up the bank, he is sure to see it, and likely this time—as the trapper would fain hope—to take it, too. So he arranges everything, obliterates his footmarks by trailing a bush over them, as he goes away, and comes again, a day or two afterwards. There lies the bait, just as it was, and close beside it are the tracks of the wolverine, where he has stood and looked at it. It was a sore temptation, doubtless, so near his nose, but he has resisted it, and gone away to get a meal that is safe, though hard earned.

Still the memory of such a lump of meat as that will be sure to linger, so next day the trapper comes again, hoping that the wolverine will have been there before him. And so he has been, but he has gone, again, with the bait, having first drawn the pine-tree out of the way, and then cut the string—which, if pulled, would have fired off the gun—only just behind the muzzle. His tracks lead down to the shores of the lake, at a part where it stretches out widely, so as to give a good view all round. There he has eaten the meat, and there the trapper finds his string, which he can use again if he likes. He does use it again two or three times, first tying it where it has been bitten through, and then arranging things in the same way. But each time it all happens over again, just as before, except that now the wolverine is careful to gnaw the string a little behind the knot, where it has, each time, been tied, as if it had thought that it might be as dangerous to be in front of this as in front of

the muzzle of the gun. So the trapper, at last, thinking that there must be a human spirit in the body of the wolverine—and a very cunning and malicious one, too—gives it up, and goes into another part of the country, so far away that he is not likely to be followed.

It is not only traps that the wolverine is fatal to. If he finds the house of a backwoodsman empty, he will get into it through a hole which he makes in the wall—never through the door, even if this should be open—and then takes away whatever there may be inside. It does not matter what the things are. Guns, kettles, knives, axes, blankets, boxes, or cans of tinned meat, it is all the same to the wolverine, he carries them all off or pushes them along with his paws, to hide them in different places—for he is like the magpie or the bizcacha in this; whatever he sees seems to have an attraction for him. Thus it has sometimes happened that a hunter and his family, having been so imprudent as to leave their "lodge" unguarded for a day or two—or perhaps having to go and there being no one to leave there—have come back and found it quite empty, only the bare walls with nothing inside them. The misfortune, however, is not so great as it seems, for the tracks of the wolvervine, or sometimes the pair of them, can be followed up, and, little by little, everything is found hidden about in the bushes. It is not often, however, that the animal itself is discovered.

Indeed the wolverine's presence is much more often felt than seen. One ill deed after another comes to light, and is surely traced to his door, but their author remains, for long periods, invisible. With a cunning that seems human,

he devises, plans, and executes, and with equal astuteness he chooses his time. When he does happen to meet a man, how does he act? He sits up on his haunches, like a dog begging, and holding one of his big, flat fore paws just above his eyes, so as to shade them from the light, looks long and earnestly at the intruder—for as such he considers him. This he will do, sometimes, three or four times, before deciding that he had better go, unless, indeed, he sees any special reason for alarm, in which case he quickly disappears. There is no other known animal, as far as I am aware, that has this odd human-like habit. No wonder the American backwoodsman, besides looking upon the wolverine (or carcajou as he calls him) as a very malignant animal, thinks him a little uncanny as well.

## CHAPTER XXVI

MAN-EATING ANIMALS—THE TIGER'S SLAVE—A SAVAGE LION-HUNT —WOLF-REARED CHILDREN—MEN AND APES—A SHAM GORILLA —UNPROHIBITED MURDER—A MONKEY'S MALISON.

WE have seen how some animals are, by their cunning and sagacity, able to compete even with man himself. At an earlier period, when wild animals were more numerous than they are now and when man had nowhere risen above the savage state, this must have been still more the case, and, even now, there are parts of the world where the struggle between man and beast can hardly be said to have been decided in favour of the former. Thus in India, in spite of its old and, in many respects, high civilisation, tigers have held their own from time immemorial, and every year numbers of the natives are killed by certain individuals amongst them, that have acquired a taste for human flesh in preference to any other.

These man-eaters, as they are called, become wonderfully cunning, and never attack either a European or a *shikaree*, or native hunter, who is always armed with his matchlock. The poor labourers or cattle-herds, on the other hand, who carry nothing, except perhaps a stick, which, of course, is of no use, are totally defenceless against these lurking fiends, which hang about the

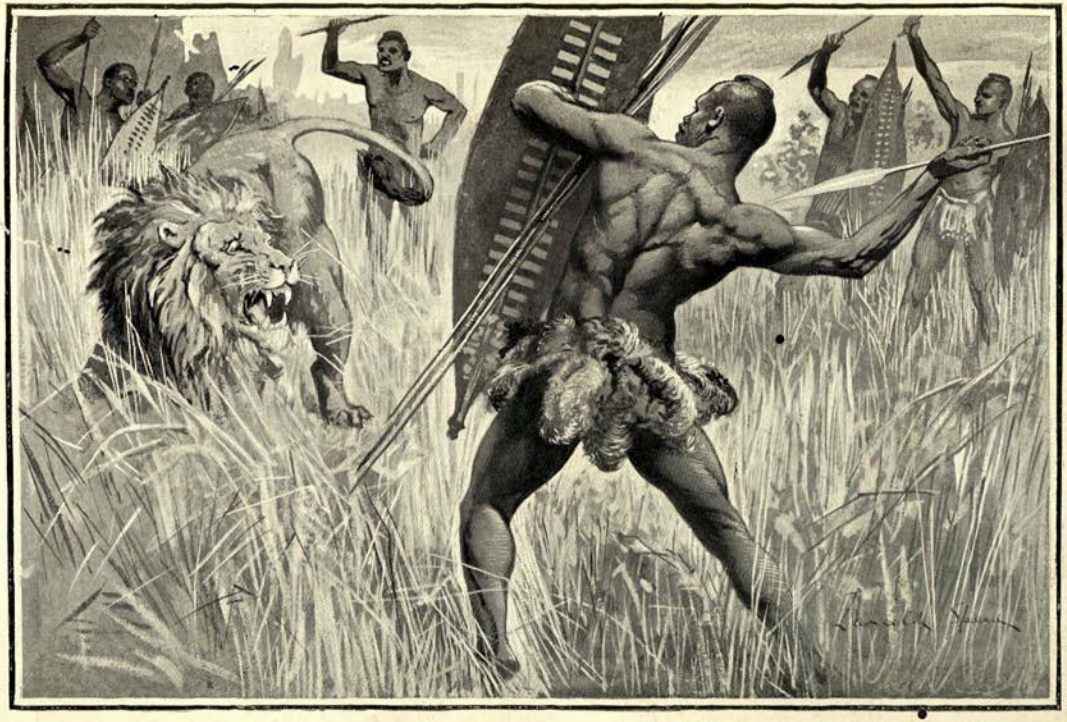
villages, and sometimes quite depopulate them. A fearful thing it must be, not to be able to stir beyond the little collection of mud and straw-thatched huts which make an Indian village without being liable to a sudden and horrible death. Sometimes, indeed, the tiger will come into the very village street and carry off a man or a woman almost from the door of their hut. Or it will lurk near the well or tank from which the water is drawn, so that to procure the precious fluid, without which the lives of the community could not be supported, individual lives must constantly be risked. The only remedy for a state of things like this is the arrival of a British officer or, at least, of a native shikaree upon the scene, and this in a country so large and densely populated as India, and with such a small scattering of Europeans in it, is not an everyday occurrence. Often, therefore, the people get tired of waiting, and after losing a certain proportion of their number, the remainder abandon the village and migrate to another part of the country altogether.

No wonder all sorts of superstitions have sprung up in the native mind concerning an animal so fierce and terrible, against which men—at least poor men—are so defenceless. One of these superstitions is that the tiger has power over the body of the man slain by him, for as long as he may care to come to it—that the man, under these circumstances, becomes, as it were, the slave of the tiger, and is bound to help his master and give him warning of danger should he see it approaching. Thus a story is told of a shikaree who went to watch by the remains of a man that a tiger had killed, hoping to shoot the

murderer when it returned at sundown to complete its repast on the body, as is the animal's habit. In the still of the afternoon, when the sun was low, the shikaree saw the tiger approaching over the level ground, but while it was still at a safe distance, the corpse, all mangled and gory as it was, raised itself a little and held up a hand in warning, on which the tiger slunk away. Twice it came back, but each time it was warned in the same way by the man that was now its slave, so the shikaree had to give it up, and go without getting a shot. If the corpse had been left there, then, even after it had become a skeleton, it would have been obliged to help the tiger, had the latter required its assistance; but no doubt it was taken away and properly buried.

The Hindoos would not suffer so much from tigers if they were a more warlike race, for, although they have no firearms, they might easily make spears, and a party of men with spears can kill the fiercest beast of prey. Thus the Kaffirs of South Africa if a lion should kill even an ox belonging to them, much more one of themselves, never rest until they have taken its life in return. The whole village arm themselves with their spears—or assegais,* as we call them—and follow up the track of the marauder till they have at last found him, however far he may have gone. They then form a circle round the lion, and holding one assegai in the right hand, and some spare ones, together with a shield large enough to cover the whole

* The word was used by the Portuguese in their great days, and may have come from a West Coast tribe. It is unknown, I believe, to the Kaffirs of South Africa.



A KAFFIR LION HUNT.

The hunters surrounded the lion shouting and singing, and the lion, confused by the noise and numbers, crouched and growled. The circle grew smaller and smaller until a single warrior rushed forward, the lion sprang upon him to be received on the point of his assegai, and was soon dispatched by the brave hunter and his comrades.

body, in the left, they begin to close in upon him, singing and shouting. The lion, when he sees so many men advancing against him, crouches down and, growling fiercely, makes ready to spring upon one of them, as soon as he comes within a certain distance. He has not long to wait. The men, continuing to advance, make the circle ever smaller, and as he turns from side to side, doubtful on which point in it first to charge, a single warrior—as arranged probably by previous agreement—rushes forward to the combat. Instantly, the lion's attention, which has been distracted amidst the numbers of his enemies, is fixed upon this one, and, with concentrated fury, he comes leaping towards him. Did the man stand to receive the charge, he would be dashed to the ground by the mere weight of the lion's body; but, skilful as brave, he sinks gracefully down, with his shield held over him, and stabs up with his assegai from underneath it. For one blow—which may or may not be fatal—the lion has time, but, almost as he makes it, twenty or thirty assegais meet in his body, as, with a tremendous yell, the rest rush down upon him, each striving to be first to shield the comrade, who has thus so splendidly performed his part. In the mêlée which ensues many of the men may be more or less badly mauled, whilst some may lose their lives, but when it is all over—and it does not last many minutes—the lion lies stretched on the ground, with hardly an inch of skin, in his whole body, not cut by the blade of an assegai. Thus, amongst the more warlike tribes of Africa, lions have no chance of becoming habitual man-eaters, as do so many tigers in India, but in those parts of the country where

the natives are timid, just the same thing happens, though, even there, there is not often so long a lease of life for the offending animal.

Most of the larger feline animals take, occasionally, to man-eating, as leopards in Asia or Africa, and jaguars in America. The puma, however, as we have seen before, is the friend of man, and never behaves in this way. Wolves, when they go in packs, are very dangerous to man, but I have not heard of their showing a special predilection for his flesh except in the province of Oude, in India, and here, since they hunt separately, for the most part, and a grown person—at least a man—would be often too strong for them, it is children that they mostly attack. "Night comes on," says someone who has lived there, "the *wolf* slinks about the village site, marking the unguarded hut. It comes to one protected by a low wall, or closed by an ill-fitting *tattie* (mat). Inside, the mother, wearied by the long day's work, is asleep with her child in her arms, unconscious of the danger at hand. The wolf makes its spring, fastens his teeth in the baby's throat, slings the little body across its back, and is off before the mother is fully aware of her loss. Pursuit is generally useless. If forced to drop its burden, the cruel creature tears it beyond power of healing, while should it elude pursuit, the morning's search results in the discovery of a few bones, the remnants of the dreadful meal."

It would seem—that is to say, there is evidence which makes it difficult not to believe so, so for my part, I do believe it—that, every now and then, a child that has been carried off in this way by a wolf, is not eaten, but

grows up with the young wolves, in the den to which it has been brought, being suckled like them by the dam. The evidence of which I speak comes from various witnesses, both native and European, and whilst the different stories told confirm one another, several "wolf-boys," as they are called, have been actually brought up in orphanages or other charitable institutions in Oude, into which they have been received, after having, according to the account of those who brought them there, been actually captured whilst in the company of wolves, and going on all fours, like them. These boys, when first caught, were just like animals in all their ways and habits, ate only raw meat, and though they got a little less wolf-like by degrees, can hardly be said to have ever become human beings, and never learnt to speak.

Here is an account of the capture of one of these poor wolf-boys. It appeared in the *Annals and Magazine of Natural History* more than fifty years ago, and is quoted by Professor Ball in his *Jungle Life in India*, where a résumé of the evidence on this subject may be found. It evidently seems as strong to him as it does to me, but I was wrong to say that it was difficult not to believe in the thing after reading the evidence for it, for the fact is that evidence has not so much effect on people as it ought to have. We believe a thing—or are inclined to believe it—or not, according to the general inclination of our mind, and then test the evidence by our belief, instead of our belief by the evidence. However, here is the account, and it is only one of several others: "Some time ago two of the King of Oude's *sawars*, riding along the

banks of the Gúmptji, saw three animals come down to drink. Two were evidently young wolves, but the third was as evidently some other animal. The sawars rushed in upon them and captured all three, and to their great surprise, found that one was a small, naked boy. He was on all fours, like his companions, had callosities on his knees and elbows, evidently caused by the attitude used in moving about, and bit and scratched violently in resisting the capture. The boy was brought up in Lucknow, where he lived some time, and may, for aught I know, be living still. He was quite unable to articulate words, but had a dog-like intellect, quick at understanding signs and so on." Again, quoting from the same paper. "There was another more wonderful, but hardly so well authenticated, story of a boy who never could get rid of a strong wolfish smell, and who was seen, not long after his capture, to be visited by three wolves, which came evidently with hostile intentions, but which, after closely examining him, he seeming not the least alarmed, played with him, and, some nights afterwards, brought their relations, making the number of visitors amount to five, the number of cubs the litter he had been taken from was composed of."

I quote these accounts as the two most interesting, and, for their evidential value, refer again to the work I have just mentioned. Then was the famous story of Romulus and Remus true after all? Supposing the brothers had been found and rescued by peasants, before they had been long with the wolf, this does not seem to me impossible, for then there would not have been time for those dread-

ful dehumanising effects, recorded in these Indian cases. But whether true or not, I have no doubt that the legend —and it is only one of many such—grew out of observed facts, and such facts were, no doubt, commoner in early times than they are now. As a reason for the child being sometimes suckled, after having been brought by one of a pair of wolves to the common den, Professor Ball suggests that if the other of them had, in the meantime, brought home something else—as, say, a kid or goat—and if this had been eaten first, the child, lying amongst the cubs, might have been received as one of them, before a fresh meal was required, in which case it would not afterwards have been hurt. He thinks it more likely, however, that the child should have been stolen by a she-wolf, to replace the loss of one or other of her cubs. I do not, myself, however, think this nearly so likely. Why should it occur to a wolf, or any animal, to replace its own young by a human child? If it wished to adopt, it would surely adopt a wolf-cub. The first of these explanations, therefore, is the one that I accept, and it seems to me a probable enough one.

Children in Oude used to be so frequently carried off, that there were people who made a livelihood by searching the wolf-dens, on the chance of finding gold ornaments there, for in India it is customary to deck children out in jewellery, of which even the poorest people seem to have a family stock. No wonder, therefore, if sometimes one should have escaped being devoured in the way above indicated; but whether the same state of things prevails at

the present time I do not know. Perhaps it does, for the people who went about looking for the jewels, did not want the wolves to be exterminated, for fear they should not be able to make an honest living, just as our own wreckers were very much opposed to the building of lighthouses, or as some shipowners think it a wicked thing that they should not be able to insure their vessels for four or five times their value. Whether they still can do this, or whether there are still professional wolf-den searchers in India, I don't quite know.

It seems possible, then, that man may sometimes live with animals, and lead the life that they do—in fact, become an animal to all intents and purposes. On the other hand, there are animals that do not fall so very far behind man, in his lowest and most savage state. I am thinking, of course, of the great man-like or anthropoid apes, in whose uncouth, satyr-like forms, and grotesque physiognomies, we no doubt see, if not actual copies of what our remote ancestors were, yet something very similar to what they must have been. This was Darwin's opinion, though from the stress that is always being laid upon his not having thought the existing apes our ancestors—as some still think he did—but only our co-descendants from a common progenitor, there is a danger of forgetting that it was. Man, according to Darwin's view, has very much diverged from this common ape ancestor, whilst the existing apes have not; but he has only so diverged through a number of steps or stages, and could we trace these back, we should soon reach beings—our real forefathers—differ-

MIDNIGHT ASSASSINS.

From the picture by Briton Riviere, R.A.

ing but little from the apes of the present day. This is really not so very different from having descended from those actual apes; but many people seem to find great comfort in thinking they have not done that. It is only tweedledum as against tweedledee, but they make the most of it.

Chief amongst these interesting beings, whose general appearance, in spite of their hairiness, their semi-quadrupedal gait and their arboreal habits, distinguishes them amongst all other animals, as being next-of-kin to man, stands the great gorilla, who lives its life in the half-twilight gloom of the forests of equatorial Africa. What is this life? Unfortunately, the little we know of it is all in connection with the persecution which these creatures, like their relatives the orangs and chimpanzees, are always liable to, and too frequently endure, at the hands of man; so that very little concerning them, beyond how they behave when shot, has as yet been made known to us. The female gorilla, it would seem, makes a shelter of woven branches amongst the trees (as do both the species above mentioned) for herself and her young one; but whether the male, who is less arboreal, does this too, I am not so sure, and indeed Du Chaillu—who, though hardly ever mentioned by writers on natural history who yet follow him, knew more than anyone else about gorillas—does not, as far as I remember, give this as one of their habits. Be this as it may, the gorilla is the least arboreal of all the anthropoid apes, not climbing nearly so well or so frequently, even as the chimpanzee—its companion in the

African forests—much less the orang-utan of Borneo and Sumatra, or the gibbon, another Asiatic species, which is the most active of all. Its great bulk would, no doubt, be against this, but as the size of any animal must stand in some sort of relation to its habits of life, it seems curious that a creature living in dense forests, and belonging to a climbing family, should have become so large as to impede its powers in this respect.

Now the male gorilla, standing, sometimes, six feet high, and being much huger and bulkier than the largest man of that height, is greatly superior in size to the female, whose stature does not often exceed four and a half feet; for which reason she appears to be, and probably is, more fitted for nimbleness and activity, amongst the branches of trees, than her huge and heavy-bodied mate. But what has led to this great disparity of size between the male and female gorilla—a disparity which does not exist to anything like the same extent in the other man-like apes? Both are nourished by the same food; both must lead—or, if they do not now, must at any rate once have led—the very same life; therefore, as it would seem, there must be some special reason for their size and strength differing so greatly. It does not seem to be quite certain whether polygamy is, or is not, the custom amongst gorillas, but there can be little doubt that the rival males often fight together, for the possession of the females. The natives showed Du Chaillu some skulls of these great apes, that had the canine teeth of the upper jaw—which in the male gorilla are almost as large as a lion's—broken off, and

this, they said, had been done in some tremendous conflict of this sort, in which their owners had been engaged. Now if the male gorillas, besides being accustomed to fight for the females, are also polygamous, this may be a reason why they have become so much larger than the latter, for the largest and strongest amongst them would always have won, and so, by collecting together a more numerous harem, would have left a greater number of offspring to inherit their size and ferocity. The females, however, not fighting, would not have grown larger in the same way, for though, in nature, the qualities of one sex are often transmitted to the other, this is by no means always the case. Generally, indeed, if not always, where there is polygamy, the sexes differ much both in size and appearance.

What a sight amidst these gloomy forests must be the contention in fierce rivalry of two full-grown male gorillas! We may imagine one—the more favoured suitor—sitting on the ground, his back, as is usual, against the trunk of a tree, and his arm flung carelessly about the object of his regard; the great fingers of the wonderfully human hand burying themselves in her fur. All at once the peaceful nature of the scene is rudely disturbed by the frowning presence of another male, whilst the silence is as suddenly broken by a terrific barking cry, passing into a long, loud, sullen, reverberating roar. The unwelcome comer has been, at first, upon all fours, but now he rears himself upon his short hind legs, and leaving the screen of heavy frondage that has hitherto partially concealed him, advances into the open space beneath this tropical tryst-

ing-tree. As he does so, the female discreetly retires, whilst her spouse, or lover, assuming also the erect posture, comes forward to meet his rival. The two advance upon each other with ferocious mien, they roar alternately, or in unison, and beat, at intervals, with their doubled fists upon the vast convexity of their chests, producing in this way a deep, continuous, hollow sound, like the rolling of a muffled drum. As the distance between them decreases, the eyes of each seem to flash more fiercely, whilst the crest of hair upon the forehead is drawn rapidly up and down, with a twitching motion, by the angry contraction of the facial muscles. At length, and with a final roar, when separated by but a few paces, each drops upon its knuckles,* and springs, almost at the same time, upon the other. Were it a man that either encountered, he would instantly be stretched dead or dying upon the ground, but here terrific strength upon the one side is met by force as great upon the other, and the combat is as long and as dubious as it is furious and violent.

After a heavy blow or two dealt with the open palm, the aim of either champion would, probably, be to pull the other towards him, so as to inflict a wound with the powerful canine teeth. As a result there would soon be a deadlock, in which the two great creatures, pressed together and grappling in a close embrace, would gnash and tear furiously at one another. As long as the limbs were not free, the fighting would be entirely with the teeth, and as

* Or, as we are told *now*, the palm of the hand.

these would probably be used to parry as well as to inflict wounds, they would constantly clash together, and might thus sometimes be broken off. How, or for how long, such a combat would be likely to proceed, what might be its result, whether the provoker of it—the bashful young gorillaress—would be unconcerned during its continuance or stand regarding it with an anxious eye from her retreat amidst the undergrowth of the forest, whether, too, by manifesting a choice she would become an active agent in the life's happiness, or otherwise, of the two grim pretendants to her favours, or go off passively with either one or the other, as mere spoils of the victor, it is not in our power to say, nor will we here further consider. Had there been as much desire to see and study the habits of the great man-ape, as there has been to procure specimens of him, which add but little to our knowledge, and that in the least interesting way, we might be well informed on all these points and many others, but, as it is, we must wait till real naturalists—people, that is to say, who love watching animals and hate killing them—go out to these regions—they are wanted everywhere. Doubtless, bad wounds are sometimes inflicted by male gorillas upon one another, in these tremendous encounters, but probably they are never fatal, since the huge framework would be as potent to resist injury as the giant strength would be to inflict it, and a gorilla that had not yet arrived at maturity would never think of trying conclusions with a full-grown one.

Though the above picture is merely imaginary, yet it is

not, perhaps, altogether void of foundation. It is natural to suppose that in attacking one of his own species, the gorilla would employ the same methods of warfare as he does against his only extraneous enemy—man; and that these are such as I have described them, the following account will show. "We walked," says Du Chaillu, "with the greatest care, making no noise at all. The countenances of the men showed that they thought themselves engaged in a very serious undertaking; but we pushed on till finally we thought we saw through the thick woods the moving of the branches and small trees, which the great beast was tearing down, probably to get from them the berries and fruits he lives on. Suddenly, as we were yet creeping along in a silence which made a heavy breath seem loud and distinct, the woods were at once filled with the tremendous barking roar of the gorilla. Then the underbrush swayed rapidly just ahead, and presently before us stood an immense male gorilla. He had gone through the jungle on all fours; but when he saw our party he erected himself and looked us boldly in the face. He stood about a dozen yards from us, and was a sight I think I shall never forget. Nearly six feet high (he proved four inches shorter), with immense body, huge chest, and great, muscular arms, with fiercely glaring, large, deep grey eyes, and a hellish expression of face, which seemed to me like some nightmare vision: thus stood before us this king of the African forest. He was not afraid of us. He stood there and beat his breast with his huge fists, till it resounded like an immense bass-drum,

which is their mode of offering defiance; meantime giving vent to roar after roar. His eyes began to flash fiercer fire as we stood motionless on the defensive, and the crest of short hair, which stands on his forehead, began to twitch rapidly up and down, while his powerful fangs were shown, as he again sent forth a thunderous roar. And now truly," exclaims Du Chaillu—upon whom, evidently, no striking sight or impressive experience was thrown away—"he reminded me of nothing but some hellish dream-creature—a being of that hideous order, half man, half beast, which we find pictured by old artists in some representations of the infernal regions. He advanced a few steps, then stopped to utter that hideous roar again —advanced again, and finally stopped, when at a distance of about six yards from us." At this point the poor gorilla, who, whatever his appearance may have been, could not, certainly, in the malignity of his intentions have surpassed Du Chaillu himself, was shot. In another moment he would, no doubt, have launched himself upon his assailants—for such the party really were—and the picture would have been reversed, except that the "half man" would have been guiltless of any premeditated design against the life of an unoffending fellow-creature.

In another encounter we find the same distribution of blame as between the whole man and the half one, but luck here is on the side of the latter. "Our little party separated, as is the custom, to stalk the wood in various directions. Gambo and I kept together. One brave fellow went off alone in a direction where he thought he could find a gorilla. The other three took another course.

We had been about an hour separated when Gambo and I heard a gun fired but a little way from us, and presently another. We were already on our way to the spot, where we hoped to see a gorilla slain, when the forest began to resound with the most terrific roars. Gambo seized my arms in great agitation, and we hurried on, both filled with a dreadful and sickening alarm. We had not gone far when our worst fears were realised. The poor, brave fellow who had gone off alone was lying on the ground in a pool of his own blood, and I thought at first quite dead. His bowels were protruding through the lacerated abdomen. Beside him lay his gun. The stock was broken, and the barrel was bent and flattened. It bore plainly the marks of the gorilla's teeth. When the unlucky hunter revived a little, he told the following story. He said that he had met the gorilla suddenly and face to face, and that it had not attempted to escape. It was, he said, a huge male, and seemed very savage. It was in a very gloomy part of the wood, and the darkness, I suppose, made him miss. He said he took good aim, and fired when the beast was only about eight yards off. The ball merely wounded it in the side. It at once began beating its chest, and with the greatest rage advanced upon him. To run away was impossible. He would have been caught in the jungle before he had gone a dozen steps. He stood his ground, and as quickly as he could reloaded his gun. Just as he raised it to fire, the gorilla dashed it out of his hands, the gun going off in the fall; then in an instant, and with a terrible roar, the animal gave him a tremendous blow with its immense open paw, frightfully lacerating the

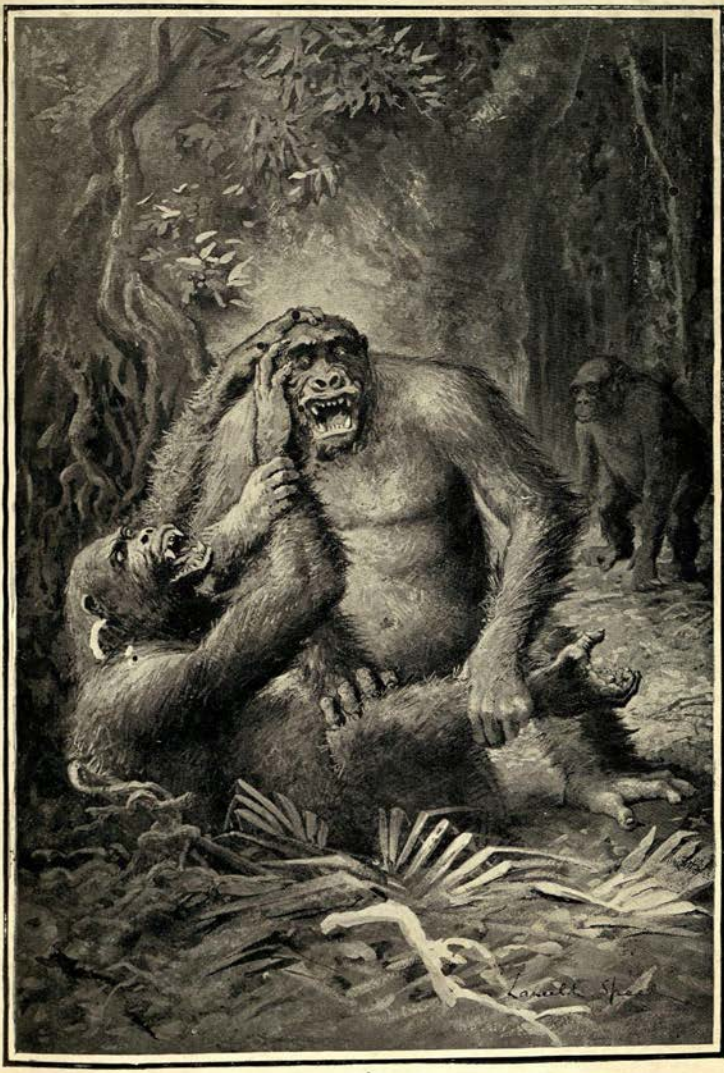
abdomen, and with this single blow laying bare part of the intestines. As he sank bleeding to the ground the monster seized the gun, and the poor hunter thought he would have his brains dashed out with it. But the gorilla seems to have looked upon this also as an enemy, and in his rage almost flattened the barrel between his strong jaws."

It is not quite certain from either of these accounts whether the gorilla made his final onslaught in the upright or the quadrupedal attitude. It seems more likely that the former is intended, but I cannot help thinking myself that in the quick rush at the end of the leisurely advance the creature would adopt his usual mode of progression, which is a sort of shambling amble on all fours, but with the fore part of the body so raised above the ground, on account of the great length of the fore arms, as to make it of a transitional character. If, for instance, a man's arms were so long that he could lean on them when running, and merely stooped a little in order to do so, we should hardly say that his gait was quadrupedal —and this is how the gorilla walks or runs under ordinary circumstances.

Du Chaillu tells us that the male gorilla is unmolested except by man, and also that he has never known a full-grown male to retreat upon his approach, or to act otherwise than as recorded in the foregoing narratives. Now gorillas live "in the loneliest and darkest portions of the dense African jungle," and to many of them man must be unknown till he seeks them out for their destruction. As a rule, when a male is discovered it is

sitting with its back against a tree—in the way I have pictured it in my imagined scene of rivalry—whilst at least one female feeds about, in its near neighbourhood. Perhaps there will be a young one sitting on the ground, or clinging to its mother's breast. Now when, for the first time in its experience, a man intrudes thus upon a gorilla's domestic privacy, and it rises and advances upon him, for what does it take him? Most probably, as it appears to me, for another and a rival gorilla—thus more than returning the "half-man" compliment paid it by Du Chaillu.

There is good evidence that monkeys of all sorts see, in ourselves, but a larger species of monkey, and even the various expressions of the human countenance seem, in some degree, intelligible to them. The gorilla sees suddenly before him, in the gloom of the forest, a creature of the same general shape as himself—of his own colour, too, for his skin is black, and so is that of a negro—whilst in size it, at least, approaches him. Minor differences, such as an unaccustomed slenderness of build, and an inferior development of jaws and teeth, are, probably, but imperfectly grasped. A peculiarly weak and weedy-looking gorilla, that, no doubt, is the general effect produced; but the masculine character is stamped upon the figure, and its approach suggests rivalry. All the details of the male gorilla's behaviour, on the occasion of these rencontres—as narrated by Du Chaillu—are explained on the above supposition. We can see now, at once, why he does not seek safety in flight, for such a retreat would both derogate from his honour, nor does it



A Gorilla Fight in the Forest.

seem to be necessary. If, indeed, he saw and smelt man, as any four-footed creature sees and smells him —but instead of that it is only another gorilla that he has to do with—an inferior and less agreeably smelling one, no doubt—a degenerate—but still presuming to rival him in the affections of his spouse. Upon this hint he acts, and is, in consequence, shot by the being that he takes for a very sorry specimen of his own species.

Space will not allow me to supplement this slight account of the gorilla with a few remarks about those two other large apes—the orang-utan and chimpanzee—which, with himself, make the three nearest approaches to the human species. Indeed, there are not very many remarks to be made, for our knowledge of these most interesting creatures is contained, for the most part, in certain horrid descriptions of the way in which they act when shot; complacent accounts—innocently worded, cheerfully told—of what are really little better than so many cold-blooded, hard-hearted murders. Everything, almost, that we have heard at first hand, has been in connection with these barbarous proceedings—how mothers, for instance, behave when shot with their infants clinging to them, or how the infants act when they find their mothers are dead: how one *mias* or *pappan* will weave branches together, to sit upon, whilst it is shot at, and another make a shift to continue alive with legs and arms broken, the spine shattered, and all sorts of other more or less important parts injured in varying degrees: bullets flattened, here and there, too—in the neck or jaws—as lesser, though

still piquant additions—enjoyable side-dishes—to the main feast of maimings and manglings.

"Tenacity of life"—"*Extraordinary* tenacity of life"—is the scientific heading under which cases of the last kind fall, and everyone must have noticed the strange and horrid sort of pleasure with which they are always recorded by those responsible for them—how their spirits seem to rise as the list of injuries grows longer—"the more the merrier," in fact, and the more harrowing the more welcome. This is what anyone interested in the ways of wild animals has to go through when he seeks for knowledge concerning them—life written very small indeed, and death, with contortions, in great flaring capital letters. Seldom, indeed, do we get the light and joy of the one unclouded by the gloom of the other. As Lady Macbeth says, "Here's the smell of the blood still." It is, I own, a mystery to me how a civilised man can deliberately kill a monkey even—much less one of the higher apes. There are many, indeed, who having shot a monkey once, have been so thoroughly upset by its reproachful and very human-like actions that they have resolved never to do so again; but as it is better to be warned through others than by one's own experience, I will conclude this small work by giving two striking cases of this kind, both of which are quoted by Professor Romanes in his interesting *Animal Intelligence.*

"I was once," says Captain Johnson—to take the first of these—"one of a party of Jeekary, in the Babor district; our tents were pitched in a large mango garden, and our horses were piquetted in the same garden, a

little distance off. When we were at dinner a Syer came to us, complaining that some of the horses had broken loose, in consequence of being frightened by monkeys (*i.e. Macacus rhesus*) on the trees. As soon as dinner was over I went out with my gun, to drive them off, and I fired with small shot at one of them, which instantly ran down to the lowest branch of the tree, as if he were going to fly at me, stopped suddenly, and coolly put his paw to the part wounded, covered with blood, and held it out for me to see. I was so much hurt at the time that it has left an impression never to be effaced, and I have never since fired a gun at any of the tribe."

The second case is to be found recorded by Sir W. Hoste in his *Memoirs*, and is thus alluded to by Jesse in *Gleanings from Natural History*: "One of his officers, coming home after a long day's shooting, saw a female monkey running along the rocks, with her young one in her arms. He immediately fired, and the animal fell. On his coming up, she grasped her little one close to her breast, and with her other hand pointed to the wound which the ball had made, and which had entered above her breast. Dipping her finger in the blood, and then holding it up, she seemed to reproach him with being the cause of her death, and consequently that of the young one, to which she frequently pointed. 'I never,' says Sir William, 'felt so much as when I heard the story, and I determined never to shoot one of these animals as long as I lived.'"

Monkeys are supposed to be less intelligent than men; and yet I never heard of a soldier, shot down in battle,

reproaching in this dumb but dreadful way the king or cabinet ministers who had sent him out to be killed. But then, when one comes to think of it, it is not quite such an easy thing for soldiers to do as it is for monkeys. Many a poor fellow, perhaps, may have had it in his mind, and even got his finger ready; but when he looked round, just before dying, for his king or his emperor or the cabinet ministers—why, they were not there, so what would have been the use of holding it up?

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